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ABSTRACT

This report describes the selection procedures used in the years 1960-1968 at the Bartlett School of Architecture at University College, London, and discusses the relationship of the criteria used in selection to the academic performance of the students admitted to the school. For the years 1960-1964, the interrelationships were also studied of the paper qualifications of the applicants, the judgments made about them by three interviewers, and their performance on two psychological tests (one of general intelligence, and one of personality). In addition, this report describes the results of a study conducted for the years 1963 and 1964 on the performance of some candidates who applied for admission to Bartlett, but who went to other schools. (AF)

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selection and academic performance of students in a university school of architecture

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SELECTION AND ACADEMIC PERFORMANCE OF STUDENTS
IN A UNIVERSITY SCHOOL OF ARCHITECTURE

by

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20 Gower Street, London, WC1.

November 1969

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M. L. J. Abercrombie
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INTRODUCTION

This monograph reports an aspect of the work of a research unit which is working in the Bartlett School of Architecture at University College London on problems of selecting and educating students of architecture. Though focussed on a particular group of university students, we believe that the studies have relevance to higher education generally. We describe the selection procedures used in the years 1960-1968, and report the relation of the criteria used in selection to the academic performance of students admitted to the School. A follow-up study has also been made in two of these years, of the performance of some candidates who applied for admission to the Bartlett but went to other schools. In three of the years we have studied the interrelationships of the paper qualifications of applicants, the judgments made about them by three interviewers, and their performance on two psychological tests, one of general intelligence, and one of personality.

The period covered in this report is significant for several reasons, some entirely domestic, others peculiar to architectural education, and others of wider national concern. Nationally, the major interest concerns the enormous increase in the numbers of students applying for admission to the universities, and the channelling, beginning in 1963, of their applications through the Central Office of the Universities Central Council of Admissions (UCCA). Our studies of the interrelationships and predictive value of criteria of selection derived from the UCCA form have general implications.

As far as the education of architects on a national scale is concerned, important developments have taken place during this period especially those resulting from the rise of the academic level of architectural education. The Royal Institution of British Architects (RIBA 1959) adopted proposals of the Oxford Conference on Architectural Education. One of these was that the minimum standard of entry to non-university schools should be raised from five passes at G.C.E. O-level to that required by universities, i.e. an additional minimum of two passes being at A-level. Another recommendation was that school courses should be situated in universities or institutions where courses of comparable standard could be conducted. Corresponding with this upgrading of architectural training as a serious intellectual pursuit, the rate of increase of applications for it received through UCCA, has been greater than the average rate of increase for all university subjects. In 1965 the total number of applications received by UCCA was 27 per cent higher than in the previous year; for architecture it was 45 per cent higher - the largest increase for any subject (UCCA 1966), and for the Bartlett still larger, 57 per cent higher than the previous year. The number of applications continued to rise slightly in 1966 and 1967 (by 16 per cent and 4 per cent respectively), but fell in 1968 by 8 per cent.

On the domestic front, changes at the Bartlett School were particularly

sudden in onset, and far reaching in their effects. Professor Llewelyn-Davies was appointed to the Bartlett Chair in Architecture in 1960, and introduced profound changes in the curriculum and methods of teaching. During this year he arranged for a new three-year B.Sc. /B.A. Degree course in architecture to start in 1961; hitherto students had obtained either a B.A. degree or a Diploma at the end of five years, or a certificate at the end of three years. The unit for research on architectural education was set up in 1963, and its first task was to help with the selection of students. It was intended from the beginning that the unit should be actively involved with the work of the School (see Abercrombie 1968), helping to improve methods of selection and education, and at the same time collecting research data, but as the present interests of the School had priority over research, "guinea-pigging" was kept to a reasonable minimum. Thus the unit asked candidates to cooperate in research by taking some psychological tests which were not used for selection; but it did not attempt to set up rigorous controls for the selection procedure, by, for instance, admitting a group of applicants picked at random for comparison with those chosen by conventional methods.

Apart from the difficulties of doing justice to the large numbers of applicants, the problems of selecting those who were most suitable for our course were particularly acute at this time of rapid change in the curriculum, and in expectations of the kind of professional work that the qualified architect would in future undertake. The selectors were attempting to identify among some hundreds of applicants, those who looked most likely to profit from the course, and to be good architects during some thirty or forty years of professional life, working in conditions we know little about, and after they had been subjected to several years of training whose impact on their development could not be foreseen. Ours was a specific example of the general problems of educating for change, which all teachers and learners have to contend with, whether or not they face it squarely. The applicants also were at a disadvantage; many of them knew very little about architectural education, reflecting the relative ignorance of the public (including school teachers) about architects, compared with, say, doctors with whom most people at some time or other come into personal contact. Even those candidates who had family or other connections with the profession, were frequently not familiar with the recent changes in architectural education, and the variations in curriculum offered by different schools. In this particular period, therefore, collaboration of research workers with the staff of the Bartlett School on selection and follow up of students offered a stiff challenge, but also rich potentialities.

Note on architectural education

During the period discussed in this Report, the Bartlett School provided courses leading to full qualification after a minimum of seven years. The undergraduate course of three years leading to the Bachelor's Degree of the University of London, gave exemption from the RIBA Intermediate Examination, but was designed to be sufficiently generalised to be useful for students who did not wish to proceed to qualification, as a basic education in matters concerning the built environment. The two year Master's Degree Course gave exemption from the RIBA Final Examination Parts I and II, and a further two years of supervised experience in practise, from the RIBA Final Examination Part III. Although some

other university schools have this pattern, there are several variations of it; for instance, some offer a first degree after five years instead of three. It is much commoner in architecture than in other disciplines, for university students to interrupt their full time education at intervals and go out into practice for a year or more. The indeterminate length of the course is one of the special hazards of research on follow up of selection procedures in this subject, which is difficult enough in most circumstances.

It is still possible to qualify as an Architect by taking part-time courses, but architectural training is following, with some years delay, the same tendency towards predominance of university based education which medicine has shown; some non-university schools have already been absorbed into universities, and part-time courses are being reduced. There were thirteen university schools with an intake of 495 students in 1967-68 (34 per cent of the total), and twenty-two non-university schools providing full time courses with an intake of 718 (49 per cent). In addition, six non-university schools with an intake of sixty-three students (4 per cent), provided part-time courses, the examinations of which are recognised by the RIBA, and a further thirty-eight colleges with an intake of 194 students (13 per cent) gave full-time or part-time tuition in preparation for examinations set by the RIBA (RIBA 1968).

What we have to say about the education of architects at the Bartlett therefore, has fairly direct relevance to the education of about one third of the present students of architecture, those at universities, and to a lesser extent, to another half who are in full-time education at non-university schools.

SELECTION

1. PROCEDURES

To qualify for admission for the B.Sc. or B.A. Degrees** at the Bartlett the candidate must satisfy the requirements for admission to the University of London, i.e. must obtain passes in the General Certificate of Education (G.C.E.) either in five subjects, of which two must be at Advanced Level, or in four subjects, of which three must be at Advanced Level. From 1960 the Bartlett School required in addition that applicants must normally have obtained a pass at Advanced Level in Mathematics (only in exceptional cases, e.g. candidates with a university degree, was this requirement waived); in 1966 it was made obligatory. (Some other schools of architecture require mathematics, or physics, or art.) As to level of performance, the Bartlett, in common with other departments of University College London, but unlike many other university departments, has not required that a candidate should reach specified grades in A-levels.

It has been the policy of the School not to offer places without interview, and this rule has been relaxed only in a few exceptional cases concerning overseas applicants. As the numbers of applicants rose, it was impossible to see them all; it was felt that about ninety was the maximum number who could be interviewed effectively. The methods of screening for interview, and selection for admission at interview, have changed continuously since Professor Llewelyn-Davies came to the Bartlett, but four phases can be distinguished:-

Phase 1. In 1960/61/62, before the Unit started work, candidates were selected for interview on the basis of their application form. This was a form used by all applicants to UCL, giving on one sheet their academic qualifications, and on a second sheet a statement of why they had chosen the particular course they applied for, and a description of their interests (the latter was the equivalent of our present Candidate's Statement form). No report was automatically received from the headmaster/headmistress, but the Bartlett wrote to the schools for one. In order to get an indication of the predictive value of the information available at interview as quickly as possible, the paper qualifications were assessed retrospectively by the unit and related to performance in examinations and studio work.

In 1960, the year in which Professor Llewelyn-Davies took up the Chair at the Bartlett, the number of students admitted was limited and he interviewed and selected these himself. In the following two years, 1961 and 1962, candidates were interviewed for 15 - 30 minutes by a board of three members of the teaching staff.

** The courses and examinations were the same for these degrees, but for admission to B.A., students must have passes in two languages other than English at Ordinary or Advanced Level. Since the introduction of the new B.Sc. Regulations in 1966, the Bartlett School is no longer registering students for the B.A. Degree.

Phase 2. 1963 was a running-in period for UCCA, and thereafter all applications had to be made through this agency. The unit advised the Bartlett staff on selection procedure, and graded the Academic Record, Referee's Report, and Candidate's Statement which were used to select candidates for interview. There was a board interview, at which comments made by interviewers were recorded. All candidates who applied in 1963, and those interviewed in 1964, were followed up, whether or not they came to the Bartlett.

Phase 3. In 1964/65/66 candidates were selected for interview on their Academic Record and Referee's Report, and only interviewees were asked to send a Candidate's Statement. The board interview was replaced by a series of three individual interviews. Psychological tests (not used for selection) were administered to the interviewees. This was a period of intense activity in collecting data about the selection process. The arrangements made it possible to compare three interviewers' judgments of the same candidate; to specify aspects of candidates assessed by different interviewers; to study the interactions of the criteria used for selection; and to relate these to information obtained from the psychological tests. As to the evaluation of the selection procedure, we have data on performance during the first year at the Bartlett of all these three cohorts, but only the 1964 cohort had taken the first degree when this report was prepared. We shall be reporting on the performance in third year of the 1964, 1965 and 1966 cohorts at a later date.

Phase 4. In 1967 and 1968 screening for interview was done as before, but a departure was made from previous custom, in which the interviewers' judgments had weighed heavily in final selection, because we had found that whereas Academic Record, Referee's Report, and Candidate's Statement were correlated with subsequent performance at the Bartlett, there was no evidence that the assessments made at interview were of good enough predictive value to warrant the expenditure of teachers' time on the scale used hitherto. Each candidate had only one interview, unless the interviewer thought him quite unsuitable for the Bartlett course, in which case he was referred to a second interviewer. As previously, psychological tests were administered but not used for selection. Data collected during selection for 1967 and 1968 are not reported here. We intend to continue this procedure for a third year, in order to give material for comparison with the three-interviewer system used in the previous three years.

When the unit started work in 1963, certain strategies were adopted that were further developed over the next four years. The first was to build the selection procedure into the rest of the work of the School. The teaching staff were interested in the general problems of assessment (both of candidates and of students) and were prepared to spend time learning about it as well as practising it. Secondly, we tried to get the various criteria used in selection graded and recorded in a standard way, in preparation for follow-up. In particular, we tried to make the judgments made at interview more explicit, and recorded them to see how they related to judgments made by the same or different teachers when they knew the candidates subsequently as students.

For the candidates too, we tried to make the interview a learning experience. The First Year students were asked to look after the candidates (this was part of their training in human relations) and show them the work of the School, giving them opportunity to judge better whether they wanted to come to the Bartlett. Unless this is done, the selection procedure is bound to be too one-sided; the emphasis is naturally on the selectors trying to find out what sort of people the applicants are, and we felt that we should also make it easier for the applicants to see what sort of people we are.

In considering suitability for admission, we had in mind the need to have students of varied personalities, and with a wide range of backgrounds, to make a rich and well balanced social climate in the School. It was agreed that we should try to get a reasonable number of women, about one in five. (This proportion is less than the national average for all courses in 1967 which was just over one in three, but slightly more than the national average in Architecture which was one in six (UCCA, 1968); in fact the ratio of admissions to applications is twice as favourable to the women as to the men among our applicants, some 15 per cent being accepted, as against 7 per cent of the men, in 1963-67.)

2. THE CANDIDATES

Numbers

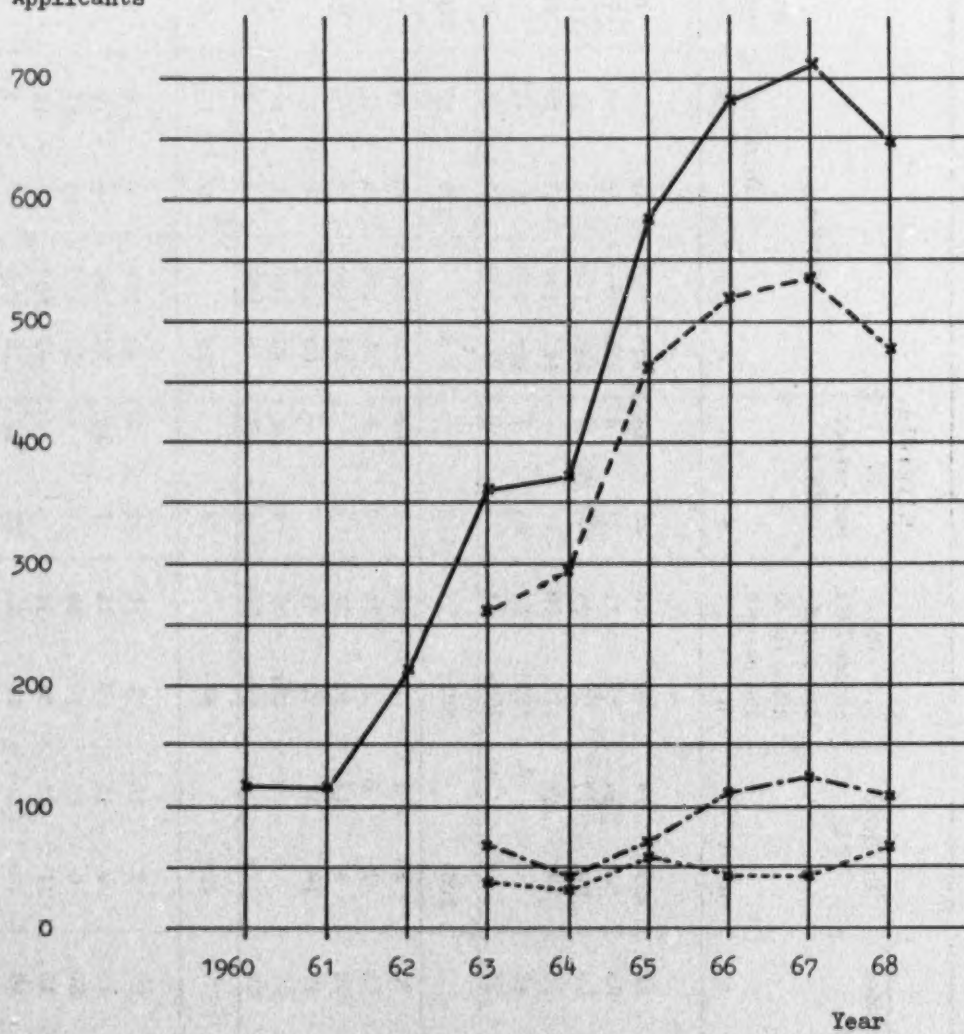
The numbers applying rose from 117 in 1960 to 707 in 1967, and fell to 649 in 1968. (Figure 1, and Table 1 shows detailed figures for 1963-68). The number of women has varied around 50 since 1963, and that of overseas candidates has doubled, but is still a small proportion of the total; it is the number of British men which has increased most dramatically.

Age

Among the men screened for interview in 1964 and 1965 over half of them (59 and 64 per cent in the two years respectively) would be eighteen years of age on entering university, a quarter nineteen, and a small number either seventeen (4 and 7 per cent), or between twenty and thirty (7 per cent). Of the women, 63 to 84 per cent would be eighteen years of age, 12 to 25 per cent nineteen, and 2 to 12 per cent seventeen; in 1964 there were no applications from women between twenty and thirty, and in 1965 there was only one. Thus, a higher proportion of the women than of the men candidates were young and a smaller proportion, over eighteen years of age.

Figure 1

APPLICANTS FOR ADMISSION 1960-68

Number of
Applicants

— Total applicants
 - - - Applicants Men Great Britain
 . . . Applicants Women Great Britain
 - . - Applicants Overseas

Note : Separate figures are not available for 1960-62

TABLE 1. Application for admission 1963-68 received by closing date.

	Eligible										Not eligible	TOTAL					
	1st choice UCL		2nd choice UCL		3rd - 6th choice UCL or no pref. after 1st or 2nd ch. etc.		No preference UCL		TOTAL								
	n	%	n	%	n	%	n	%	n	%	Inter- viewed n	Admit- ted n	n				
Great Britain MEN	1963	92	49	27	14	44	23	25	13	188	100	28	15	76	22	72	260
	1964	151	65	34	15	26	11	21	9	232	100	38	16	73	22	61	293
	1965	223	58	66	17	97	25	-	-	386	100	54	14	111	33	76	462
	1966	232	53	79	18	129	29	-	-	440	100	64	15	98	30	80	520
	1967	208	42	+	+	254+	51+	34	7	496	100	82	17	78	36	41	537
	1968	127	31	+	+	251+	61+	33	8	411	100	59	14	69	*	66	477
1963-68	1,033		206+		801+		113		2,153		325	15	505		396	2,549	
WOMEN	1963	21	72	2	7	3	10	3	10	29	100	10	34	19	6	12	41
	1964	17	71	2	8	5	21	0	0	24	100	3	13	8	5	9	33
	1965	29	59	8	17	12	24	-	-	49	100	2	4	21	6	4	53
	1966	17	44	10	25	12	31	-	-	39	100	6	15	20	10	8	47
	1967	17	39	+	+	26+	59+	1	2	44	100	6	14	10	6	2	46
	1968	25	42	+	+	30+	51+	4	7	59	100	4	7	18	*	7	66
1963-68	126		22+		88+		8		244		31	13	96		42	286	
Overseas MEN and WOMEN	1963	19	69	7	16	4	10	2	5	42	100	0	0	10	2	16	58
	1964	4	41	5	15	8	24	7	20	34	100	4	12	4	3	12	46
	1965	5	60	6	11	15	29	-	-	52	100	11	21	7	3	18	70
	1966	4	45	21	21	35	34	-	-	102	100	13	13	8	0	10	112
	1967	5	46	+	+	41+	35+	23	19	119	100	8	8	8	3	5	124
	1968	5	51	+	+	22+	23+	25	26	97	100	6	6	8	*	9	106
1963-68	22		30+		125		57		446		42	9	45		70	516	

TOTAL	1963	142	55	36	14	51	20	30	11	259	100	38	15	105	30	100	359
1964	182	63	41	14	39	13	28	28	10	290	100	45	16	85	30	82	372
1965	283	58	80	16	124	26	-	-	-	487	100	67	14	139	42	98	585
1966	295	51	110	19	176	30	-	-	-	581	100	83	14	126	40	98	679
1967	280	42	+	+	321+	49+	58	58	9	659	100	96	15	96	45	48	707
1968	202	36	+	+	303+	53+	62	62	11	567	100	69	12	95	*	82	649
Grand Total	1,384	49	267+	9+	1,014+	36+	178	178	6	2,843	100	398	14	646	187*	508	3,151
1960)	details not available																
1961)																	
1962)																	

Not eligible = has not taken or not taking examinations which would qualify for admission (usually not taking A-level Mathematics).

Not qualified = eligible but not yet having passes in 5 O-levels with 2 A-levels of which one is Mathematics, or 4 O-levels with 3 A-levels of which one is Mathematics.

+ = In 1967 and 1968, 2nd choice UCL were included with 3rd-6th choice by Bartlett as only 1st choice UCL, 1st choice after Cambridge and no preference candidates were considered for interview.

* = The figures for 1968 were not available at the time of submission to press.

Note on choice

1963: Candidates were asked to list 4 universities in order of choice, or to state no preference, or no preference after 1st or 2nd choice.

1964: Candidates were asked to make six choices in four universities only, or to state no preference, or no preference after 1st or 2nd choice.

1965: Candidates were asked to list six universities in order of choice.

1966: - ditto -

1967: Candidates were asked to list six universities in order of choice, or to state no preference, or no preference after 1st, 2nd, 3rd or 4th choice.

1968: - ditto -

Social Class

The social origins and schools of 1,002 male candidates from Great Britain applying in 1964/5/6 have been studied (there were 56 others in this group about whom information is incomplete).

The majority (88 per cent) of our applicants came from the upper three of the Registrar General's Social Classes. This is a bigger proportion than is the case in all university entrants (70 per cent) (Robbins 1963). Table 2 shows that the great disparities are in Class III (Clerical), from which proportionately came three times as many Bartlett candidates as all university entrants, and in Class IV (Skilled Manual), from which came seven times as many university entrants as Bartlett applicants.

TABLE 2. Percentage of applications and entrants from each of the Registrar General's five social classes compared with the general university population

Social Class	<u>Bartlett Applicants</u>	<u>Bartlett Entrants</u>	<u>All University Entrants **</u>
I Higher Professional	26	31	21
II Management and other professional	36	42	40
III Clerical	26	18	9
IV Skilled manual	3	2	20
V Semi- and unskilled	0	0	6
Unclassified	8	6	4

Bartlett applicants = Men (Great Britain) 1964-66 n = 1002

Bartlett entrants = " " " " n = 84

** All university entrants = children born in 1940/1

** Source: Robbins 1963a. (p. 41)

School

Table 3 shows the types of school at which the same 1,002 candidates were educated; 60 per cent came from direct grant and grammar schools, 23 from independent schools, and around 5 per cent from each of comprehensive or bilateral, technical, and secondary modern schools. Compared with the general university population (Robbins 1963), more of our candidates came from comprehensive and other non-grammar schools.

TABLE 3. Percentage of applicants and entrants from each type of school compared with the general university population.

Type of School	<u>Bartlett Applicants</u>	<u>Bartlett Entrants</u>	<u>All University Entrants**</u>
Independent	23	20	23
Direct grant & grammar	60	70	75
Comprehensive & bilateral	4	0	1
Technical	6	4	0
Sec. modern	5	6	0
Unclassified	2	0	0

Bartlett applicants = men (Great Britain) 1964-66 n = 1002

Bartlett entrants = " " " " n = 84

** All university entrants = England and Wales 1960/1

** Source: Robbins 1963a (p.229).

Academic qualifications

Table 4a shows the proportion of applicants with certain numbers of O-level passes. Of the men candidates, over a half (57 per cent) had six, seven or eight passes, a third nine or more, and 9 per cent five or less. The women tended to do better, nearly a half having nine or more passes; the range over the four years recorded was wider for the women, but their numbers were smaller. A slightly higher proportion of the candidates not taking A-level Maths, did not do quite so well as those taking it, fewer having nine or more passes.

TABLE 4. Academic qualifications of applicants from Great Britain, 1963-66.

a. Numbers of subjects passed at O-level on application.

Number of O-level passes	Taking A-level Maths **						Not taking A-level Maths **					
	men			women			men			women		
	n	r%	m%	n	r%	m%	n	r%	m%	n	r%	m%
Less than 6	112	8-10	9	7	0-17	5	36	16-19	18	1	0-8	4
6, 7 or 8	715	55-61	57	68	38-62	48	113	48-62	56	16	25-75	64
9 or more	419	29-37	34	66	21-59	47	52	20-33	26	8	17-75	32
Total	1246	-	100	141	-	100	201	-	100	25	-	100

** r = range over years 1963, 1964, 1965, 1966 for those taking A-level Maths and over years 1963, 1964, 1965 only for those not taking A-level Maths

m = mean

TABLE 4. Academic qualifications of applicants (Great Britain) 1963-64.

b. Subjects passed at O-level at time of application.

O - Level Subjects	Taking A-level Maths						Not taking A-level Maths					
	men n = 420			women n = 53			men n = 133			women n = 21		
	n	r%	m%	n	r%	m%	n	r%	m%	n	r%	m%
Maths	417	99	99	53	100	100	116	85-90	87	19	84-100	90
Physics	319	75	76	24	38-52	45	49	31-42	37	0	-	-
Chemistry	229	52-56	55	21	38-42	40	34	25-26	26	2	9-11	10
Gen. Science, Physics with Chemistry, Eng. Science, Agriculture	85	19-22	20	21	38-42	40	31	21-26	23	9	42-45	43
Biology, Anatomy, Botany, Zoology, Physiology	61	12-17	15	22	38-46	42	23	14-30	21	10	34-67	48
Eng. Language, Eng. Lit.	413	98-99	98	53	100	100	117	84-94	88	21	100	100
Classical Lang.	120	29	29	33	54-69	62	46	33-36	35	11	50-56	52
Modern Lang.	303	67-78	72	52	96-100	98	86	64-66	65	19	89-92	90
Art/Architecture	234	51-62	56	38	66-79	72	70	46-61	53	16	67-84	76
Technical subjects	108	26	26	1	0-4	2	11	5-11	8	2	0-17	10
History, Economics	149	35-36	35	26	45-54	49	68	46-58	51	14	59-78	67
Geography	179	41-45	43	26	46-52	49	66	45-56	50	9	42-45	43
Music, Religious Knowledge	52	12-13	12	16	25-35	30	17	12-14	13	4	11-25	19

r = range. m = mean.

Table 4b gives the subjects passed at O-level in 1963 and 1964. The percentages passed in each subject were fairly similar in the two years. Compared with the men, fewer women took Physics and Chemistry, and very few took technical subjects, but a higher proportion took all other subjects. (This reflects the larger number of subjects taken by girls. In 1964-66 approximately two-thirds of the candidates had no A-level passes, a quarter one or two, and an eighth three or more. About 15 per cent were qualified for admission to the Bartlett at the time of application.

The subjects taken or to be taken at A-level are tabulated in Table 4c for the years 1963-65. Of the men taking A-level mathematics, three-quarters were taking Physics, one quarter Chemistry, and over half Art with history of architecture; other subjects were taken by small numbers. Fewer women took Physics and Chemistry and more took Art/Architecture. No women took Geology or technical subjects, but more women took all other subjects.

The effect of the A-level Maths requirement on our catchment population can be seen by comparing the G.C.E. subjects of eligible and ineligible candidates. Even at O-level there was a bias towards science in the candidates taking Maths at A-level, the proportion taking Physics or Chemistry being twice as great as in those not taking Maths at A-level (Table 4b). Similar trends are shown at A-level; whereas three-quarters of eligible men were taking Physics at A-level, only a quarter of the ineligible ones were; a larger proportion (over one-third) of the ineligible group were taking History/Economics or Geography or English Literature compared with a tenth or so of the eligible group (Table 4c). The same proportion (over a half) were taking Art/Architecture.

TABLE 4. Academic qualifications of applicants (Great Britain) 1963-65.

c. Subjects taken or to be taken at A-level at time of application.

A-Level Subjects	Taking A-level Maths				Not taking A-level Maths			
	men		women		men		women	
	n	r %	m %	n	n	r %	n	m %
Maths P & A	383	43-52	48	46	24-58	45		
Applied	233	29-35	29	42	35-55	41		
Pure	305	33-40	38	57	46-66	56		
for Science	137	15-20	17	1	0-4	1		
Further	16	0-4	2	2	0-4	2		
General	3	0-1	0	0	-	-		
Physics	606	71-82	75	49	39-58	48		
Chemistry	195	21-33	24	10	6-21	10		
Biology, Botany, Zoology	8	1-2	1	5	4-6	5		
Geology	6	0-3	1	0	-	-		
Eng. Lit.	46	5-7	6	15	9-17	15		
Classical Lang.	4	0-1	0	4	0-6	4		
Modern Lang.	38	3-5	5	12	4-19	12		
Art/Architecture	429	49-60	53	72	58-84	71		
Technical subjects	69	5-10	9	0	-	-		
History, Economics	58	5-10	7	16	12-21	16		
Geography	95	10-14	12	13	11-14	13		
Music, Religious Knowledge	4	0-3	0	1	0-2	1		

r = range. m = mean.

3. SCREENING FOR INTERVIEW

Screening for interview was done by the unit and checked by the Tutor. After eliminating applicants who were not taking the necessary steps to qualify for admission (e.g. not taking A-level mathematics), three categories of applicants were considered separately: men, resident and educated in Great Britain; women, resident and educated in Great Britain; and overseas candidates, whose education had taken place entirely or partly abroad. We felt that the assessments would be sounder if the women were considered as a separate category, since at this age they tend to be academically and socially at an advantage compared with men (see p.11 & 19, Tables 4a and 6a). The overseas applicants, even if at present resident in this country, were specially difficult to assess, because of the many cross-cultural differences, including variations in educational background, and inadequacy of the Referee's Report. In a very few exceptional cases, candidates not resident in this country whose paper qualifications were strong were offered places without interview.

Since 1963 applications have been made through UCCA and candidates have been asked to name their order of preference among the universities they applied to. Our policy about preference has varied with our experience. At first, we decided to give priority to those candidates who had put the Bartlett first on their list, but it was found at interview that their choice was made mostly at random, and in ignorance of the particular courses offered by various schools, so that it could easily be affected by information subsequently obtained, for example, at interview. We therefore considered all candidates for interview, whatever their preference, but then found that a greater proportion of those who did not put us first, withdrew after being offered a place, (see p.28) so this policy was uneconomical. Moreover, we realised, that as limited time was available for interviews, we were penalising candidates who put us first, by not giving them priority over those who did not put them first. In 1967 and 1968 therefore, in order to economise on time and effort expended on interviewing, we have given priority to those who named the Bartlett as their first choice, or first after Cambridge (because many of those who are best academically wish to go there, but do not succeed), or who gave no preference. Our doubts as selectors about how to deal most effectively with preferences are as nothing compared with those that harass the applicants. If their first preference is for a department that many others happen to prefer, they lessen their chance of getting into the school next on their list. The choice has to be made in ignorance of capricious changes in the popularity poll, and usually in ignorance of the current situation in the various schools, such is the rapidity of the many changes in curricula and teaching methods that are occurring.

The distribution of degrees of preference expressed for the Bartlett is shown in Table 1. The percentage of applicants eligible for interview who named UCL as their first choice has fallen from 63 per cent in 1964 to 36 per cent in 1968. Among the many factors which contribute to this change, the extension of the UCCA scheme to include Cambridge University, the CATS and some architectural schools recently transferred to the universities, may be mentioned.

Three pieces of information were available before interview: the candidate's Academic Record, his Referee's Report, and his Statement about his

interests and activities. Each of these was graded on a scale of desirability (A - E with intermediate grades giving ten points) by one member of the unit, and checked by another. The assessments were subjective, but we found that there was good agreement between us, and any differences were easily resolved in discussion. Each of these three paper qualifications has some predictive value for success at the Bartlett (p.85), and interesting relationships with the DPI psychological test (see pp.49-56).

Over the years 1963-68 in screening for interview, priority was given to candidates with good Academic Record and Referee's Report. In 1963 the Candidate's Statement was also used in screening for interview, but in later years, in order to economise on administrative work, only candidates invited to interview were asked to send a statement.

Academic Record at Application (AR App.)

Academic Record was graded by taking account of the number of subjects passed; the grades obtained, especially repeated failures; the ages at which examinations had been taken; how many subjects were taken at a sitting; range of subjects; and kind of school and family background. In ordinary circumstances six, seven or eight passes can be considered average (see p.11 and Table 4a), but the number of subjects taken varies with the policy of the school. In some schools, for instance, the subjects which a pupil intends to continue in the sixth form will not be taken in the O-level examinations, and in such cases the number of O-level passes may be small. Often the Head explains the school policy in this respect in his report on the candidate.

Examples of our grading of O-level performance are shown in Table 5. Grade A is reserved for those with some signs of distinction; B is given for a good all round performance (in general, A or B would not be given to a record with failures in any subject); C average; D weak (few subjects, unduly scattered, taken late for no good reason, some failures); and E, very weak. If any A-levels had been taken the results would also be taken into account.

Referee's Report (RR)

The Referee's Report, usually the headmaster or headmistress, (for which a whole sheet is provided in the UCCA form) was graded from A to E according to our estimate of its warmth of support for the candidate and confidence in his future as a student, bearing in mind how well the referee seemed to know the candidate, and to understand the requirements of architectural training. There are some obvious limitations to the value of these reports. The referee, in wanting to do his best for his candidate, may give too optimistic a report, and school teachers are less likely to be well acquainted with what is demanded of an architect than, say, of a physicist. There were plenty of examples indicating that the need for intellectual rigour in architecture is underestimated, e.g. one Head commented of an applicant, "of average ability but in Art he is a very able draughtsman. He should obtain his A-level subjects, perhaps with low grades. He is recommended as very suitable for a course in Architecture, for which he shows great interest and considerable practical ability." Such statements are becoming rarer. A

TABLE 5. Example of Academic Record Grades awarded by screeners for O-level performance.

O-level examinations	Academic Record Grade (AR App.)				
	A	B	C	D	E
Maths	1,1	3,4	4	4	4
Physics	1	3		6	6
Chemistry		3	F	6	F
Gen. Sc.					F:F
Biology				F:6,6	F:F
English Lang./Lit.	2	3,3	3,6		
Class Lang.		5	F:3		
Modern Lang.	4	2	3		F
Art			4	4	3
Technical Subjects	3,1				
History		1	6		
Geography	4		F:4		
No. passed/taken at given age	8/8 at 16.2	9/9 at 16.3	5/8 at 15.4 8/11 at 15.8	3/4 at 16.6 4/5 at 16.10 5/6 at 17.6	3/7 at 16.6 3/9 at 17.6

O-level grades are 1 (highest) to 6, and below 6, fail.

1,1 = grades in 2 papers at same sitting.

F:3 = grades in one subject at separate sittings.

further difficulty is that architecture needs some non-conformists, but they may be underrated by their teachers. (There is some evidence that 'creativity' is correlated with non-conformity in school children, but teachers tend to value conformist pupils more than non-conformist ones (Getzels and Jackson, 1962).) In spite of these limitations, we felt the Referee's Report did help us in making decisions about which candidates we should call for interview. Many of the comments made (e.g. about illness or family difficulties, change of plans, extra-academic activities) helped us, we felt, to evaluate the candidate's examination record more fairly, and also indicated points which could be usefully taken up at interview. We should like to pay tribute to the immense amount of trouble which is being taken by increasing numbers of referees, and to the lively, perspicacious and affectionate pen portraits which many produce. As we shall see (p.80) these reports have some positive relationship with performance at the Bartlett.

Candidate's Statement (CS)

The UCCA application form gave only a couple of inches of space for the candidates to describe their extra-academic activities. We asked them to supplement this with fuller statements about their main interests and activities, together with the reasons which led them to choose architecture as a career, and to apply to the Bartlett School. In 1963, all candidates were asked to give this extended statement, and the grading was used in selecting for interview, but in 1964 and afterwards, in order to reduce the amount of administrative work involved by the increasing numbers of applicants, and to avoid raising false hopes in too many of them, only those invited to interview were asked to write one. In assessing these statements on the A - E scale we looked for evidence of wide interests, a flexible outlook, and a generally energetic and productive way of life. Social class, family status, and kind of school attended were noted in interpreting the material; thus a statement which seemed dull, stilted and unimaginative, might be considered to indicate mediocrity in the offspring of a professional man going to a 'progressive' school, but only a reasonable need to conform, or to play safe in unknown territory, in the son of an artisan attending a grammar school. Not only did we feel that this statement helped us to evaluate candidates, but we found that there is a significant correlation between Candidate's Statement and performance at the Bartlett (see p. 80).

Distribution of grades

Fig. 2 shows the distribution of grades awarded for the three criteria in the years 1963-68 combined (for male candidates from Great Britain) and Table 6a,b gives the mean and range for both men and women. It will be noted that the women tended to get higher grades than the men on all three paper qualifications.

4. INTERVIEW

We did not interview anyone until all the applications had been screened, and then the interviews were arranged over as short a period as possible in the attempt to keep standards constant. In 1963, they were spread over eight weeks,

Figure 2

ASSESSMENT OF APPLICANTS MEN GREAT BRITAIN 1963-68

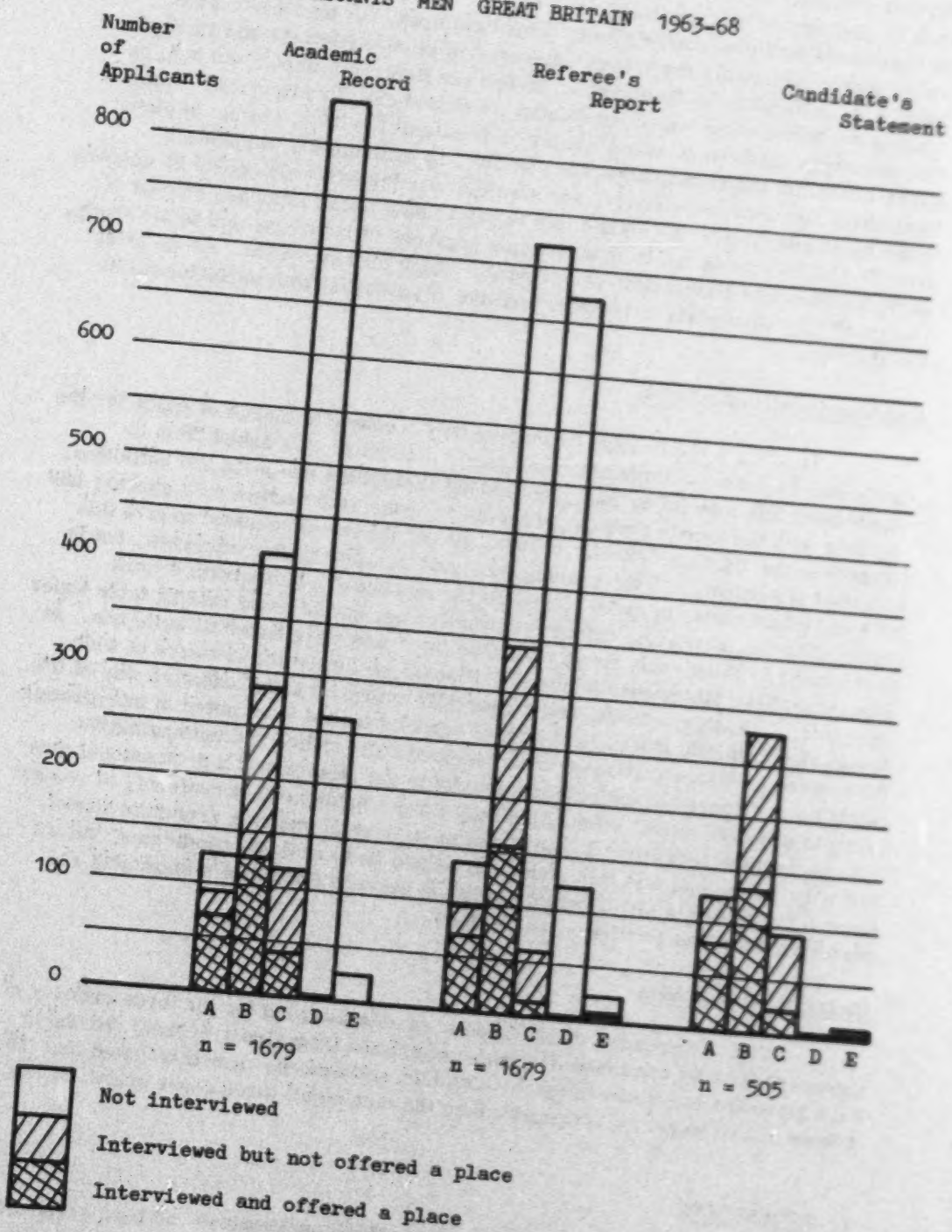


TABLE 6. Assessments of applicants (Great Britain) 1963-69.
a. Academic Record on Application and Referee's Report.

Grade	MEN n = 1,679						WOMEN n = 194					
	AR App.			RR			AR App.			RR		
	n	r%	m%	n	r%	m%	n	r%	m%	n	r%	m%
A	129	6-13	9	139	7-11	8	44	13-38	23	41	12-38	21
B	414	19-33	25	722	35-66	43	61	22-42	31	95	26-68	49
C	944	44-57	36	672	27-49	40	78	17-66	40	51	14-52	26
D	265	9-25	16	124	4-11	5	10	0-5	5	6	0-6	3
E	27	0-4	1	23	1-3	1	1	0-3	1	1	0-3	1
Total 1963-69**	1679	-	100	1679	-	100	194	-	100	194	-	100

**Note: In 1963-69, all eligible candidates were assessed, and in 1967 and 1968 only those placing UCL first choice, let choice after Cambridge, or no preference.

r = range. m = mean.

TABLE 6. Assessment of applicants (Great Britain) 1963-68.

b. Candidate's Statement+

Grade	MEN n = 505			WOMEN n = 96		
	n	r%	m%	n	r%	m%
A	125	17-38	25	36	0-61	38
B	279	46-61	55	49	33-65	51
C	92	10-27	18	10	0-40	10
D	2	0-1	0	0	-	-
E	7	0-4	2	1	0-5	1
Total	505	-	100	96	-	100

+Assessment of candidates' statements is shown only for those candidates who were interviewed.

r = range. m = mean.

In 1964/5/6, over five, three and three weeks respectively, and in 1967/68, with a different method of interviewing, over three days and two days respectively. Between 85 and 139 candidates have been interviewed a year (Table 1). Interviewees were asked to send a photograph of themselves, which helped their interviewers to identify them in discussions on final decisions. The interviewers were given the application material of their candidates before they saw them, and this material was available during the interview. They also looked at examples of applications from candidates who had not been selected for interview, in order to get some idea of the standards used by the screeners.

In 1963, a conventional board interview was given. There was a nucleus of three interviewers (the Tutor, the First Year Master, and a member of the unit), and another (changing) member of the teaching staff. The permanent nucleus ensured consistency of standards from one interviewing session to another, and the changing member helped to prevent the nucleus from becoming too stereotyped. The aim of the interview was to assess 'suitability as a member of the Bartlett School', and 'potentiality as an architect'. Questions on reasons for wishing to become an architect, buildings seen, books read, hobbies, etc., were put to candidates, and a stenographer noted down their answers. Interviewees were asked to bring portfolios of their drawings, photographs they had taken, models, pottery and sculpture, etc. (or photographs of them). Examination of

these, and discussion around them provided useful material for guessing at architectural promise. (This is the kind of interview used at some other schools, as we were able to see when, by courtesy of the Principal, Mr. W. Allen, we sat in on interviews at the Architectural Association School.) Each member of the board recorded his comments on the candidate and graded him on a five-point scale. The gradings were then discussed and a final grade agreed upon. At weekly intervals the candidates were ranked and after a final review the top 33 candidates were offered places, and the next 18 put on the reserve list. The notes taken at interview were helpful in this review.

In 1964, the board interview was replaced by a series of four individual interviews, and in 1965 and 1966, by three, each of twenty minutes. Each interviewer, a member of the teaching staff, attempted to assess a different aspect (relevant to his own interests) of the applicant's work. In this way, the teachers' time was more economically used than before, the candidate being interviewed for a longer period with the same expenditure of staff time. Three interviews may seem an ordeal for the candidates, but we hoped they would feel that they had had a better chance than with a single interviewer, and that they would feel at ease with at least one of them (many people after an interview wish they had said something they did not think of at the time, or wish they had been asked different questions, or had been interviewed by a different person). In fact many of the interviewees commented that they liked this interview system.

The three interviews common to the three years comprised the following (a fourth interview given in 1964, based on a specific building plan, was dropped because candidates' experience of plans varied widely):

Interview 1: General assessment. A general interview, designed to test principally the candidate's sensitivity to his environment, his awareness of things, people and spaces, and his range of interests. Questions were asked to assess extra-curricular reading relevant to architecture, and observation of buildings seen daily, or on holiday, or specially visited.

Interview 2: Science. To assess his ability to take the construction and structures courses, and his scientific attitude generally.

Interview 3: Design. To assess his ability to design, by discussion of his portfolio and other products (i.e. sculpture, pottery, models, photographs, etc.). The interviewer sought to test the candidate's agility of mind, his range of interest and appetite, and practical skill in embodying ideas. Candidates were sometimes asked to make a quick sketch of a familiar animal or bird, a vehicle, or a piece of furniture or equipment.

The following aspects of the candidate were assessed at one or more of the interviews:-

	<u>Assessed in interview</u>
1. Sensitivity to environment; awareness of things, people and spaces	1
2. Range of interest; appetite	1, 2, 3
3. Ability to organise material conceptually in an effective, orderly, coherent way as distinct from parrot reproduction or triteness - clarity of thought	2
4. Ability to organise material concretely in an effective, orderly, coherent way - aesthetic value of products	3
5. Personal likeability (included as this might influence the other grades)	1, 2, 3
6. Global grade	1, 2, 3

The method of assessment finally adopted was for each interviewer to give a mark on a ten-point scale to each candidate for his performance in any of the above items which were assessable at that interview. This represented his opinion of the desirability of the candidate with regard to the particular group of characteristics which were assessable in the light of the discussion, and the interviewer made notes giving the reasons for his judgment, and evidence to support it. At the end of the afternoon, each team of three interviewers met together to discuss the ratings given, to investigate discrepancies, and to agree on a decision for each candidate of 'definite accept', 'holding decision', or 'definite reject'. On the assumption that the candidates had been allocated at random between the teams (care was taken that this should be so, as far as grades on paper qualifications were concerned), each team was asked to recommend acceptance of approximately the same proportion of candidates. The 'holding decision' candidates were reconsidered after all the interviews were finished, and the final list of candidates to be offered a place, to be put on the waiting list (in rank order) or rejected, was then drawn up. In 1964, there was one team interviewing eight candidates per day; in 1965, two teams and in 1966, three, working concurrently.

In 1967 it was decided to give less weight to the interview, (see under 5 below), and to economise on teachers' time by giving each candidate one twenty-minute interview instead of three, except in cases where the interviewer thought him quite unsuitable for the Bartlett course, when he was referred to a second interviewer. Interviewers were asked to acquaint the candidate with the aims and nature of the Bartlett course, to answer his questions, and from the resulting discussion and examination of the portfolio to decide to recommend: "definite accept" (A), "lukewarm accept" (B), "neutral" (C), or "reject" (D or E). Interviewees were ranked on the sum of their grades on Academic Record, Referee's Report, Candidate's Statement and interview. This procedure was

repeated in 1968. We shall be comparing this system with the 3-interviews system used in 1964-66.

5. WEIGHTING OF SELECTION CRITERIA

The weight given to the various criteria available at selection has varied. In 1963, Academic Record was given most weight in screening for interview because its predictive value for success in university examinations was known to be fairly good (Dale 1954, Furneaux 1961). Although there are, of course, plenty of examples of distinguished people having had youthful difficulties with examinations, in present conditions the passing of certain examinations is an essential prerequisite for professional life, and it is important to cut down wastage from failure in them. Applicants graded A and most of those graded B were invited to come to interview. Those scoring C, D and E were not called to interview unless they had high grades in their Referee's Report.

In the early years, in selecting from the interviewees, the interviewer's judgments were decisive. Usually, these were made without deliberately considering the other grades, though all the material was available, and in border line cases the paper qualifications were taken into account. But as in the follow-up studies, we became increasingly confident in the value of the paper qualifications, while the interview by contrast seemed precarious, we took these more and more into account in making the final decision. A study of the inter-correlations of the paper qualifications and the final decision on offering places, shows no relationship in 1964, but a significant relationship with AR and RR in 1966 (see Table 13). From 1967, interviewees are ranked for acceptability on the sum of the grades given for the three paper qualifications and the interview.

6. PSYCHOLOGICAL TESTS GIVEN AT INTERVIEW

A series of tests taking about three or four hours has been given to candidates who were interviewed for admission in 1964 and after. It was explained to the candidates that these tests were part of our research programme and would in no way be used for selection. The intention was to explore the relation of performance in three kinds of test, general intelligence, spatial ability, and personality, with each other, with paper qualifications and the results of the selection procedure, and with performance in architectural education. Only two of them - AH5 and DPI - were used throughout, and the discussion below of the 1964-66 cohorts is restricted to results from these two tests. Use of the other tests was discontinued for various reasons; either because of difficulties in their administration, scoring or interpretation, or because they were subsequently used in other contexts where they were likely to provide more information.

Results from these other tests are not provided in this monograph for reasons of economy, and because they are restricted to only one year's group of interviewees. They will appear in other reports. The cumulative picture

provided by repeated tests would appear to be more valid (see for example, Stringer 1967; and various studies on personality and spatial ability referred to below).

1964

AH5 (Heim undated), a test of high grade intelligence (general reasoning ability). It was chosen because it consists of two parts, the first comprising verbal and numerical problems, the second problems in diagrammatic form, and thus makes it possible to detect bias towards reasoning "verbally" or "non-verbally". Administered 1964-68.

Dynamic Personality Inventory (Grygier, 1961). The 325 items of the DPI 'include objects, concepts and activities which are associated with one or more relevant personality traits, tendencies and defence mechanisms'. Reactions to the items are given in terms of like or dislike, and answers reflect responses to a wide range of stimuli familiar in everyday life. Although the test has its basis in psychoanalytic developmental theory, the interpretation of the scores is not intended to be bound by such an approach. Administered 1964-68.

Circles (based on a "creativity" test by Torrance). The subject is asked to use the page of blank circles within squares to draw as many objects as possible in a limited time (drawing ability is not assessed, as each object is labelled). Various kinds of scores can be derived from this test: "fluency" (total number of drawings), "flexibility" (number of different categories of drawings) and "originality" (statistically unusual responses). (This test was difficult to score and was not given in later years.)

The Gough-Sanford Rigidity Scale (Gough and Sanford, 1952). The subject is asked to state to what extent he agrees or disagrees with twenty-two statements. The bias and strength of the subject's responses may give indications of psychological rigidity. Administered 1964/65.

Adjective Check List (Gough and Hellbrun, 1965). Consists of three hundred adjectives commonly used to describe attributes of an individual which the subject is asked to check as descriptive of himself. An assessment of the strength of various personality attributes is made from this, e.g. need for achievement, personal adjustment, counselling readiness, lability. (This test was not given at interview subsequently, as it is included in a battery of tests which is given to students after admission, as part of a study being made in collaboration with the Institute of Personality Assessment and Research, Berkeley, California).

Hidden Figures (Thurstone's adaptation of the Gottschaldt figures). The task is to discover whether a simple stimulus figure is or is not concealed in a more complex figure. Some previous research has suggested that difficulties with this task may be related to psychological rigidity in dealing with new material. (This test was found to be insufficiently discriminating, and was not given later.)

1965

We repeated the Gough-Sanford Rigidity Scale and added two new tests, with which it was hoped to find out more about 'spatial ability' and its relevance to architecture students. The tests were:-

DAT Space Relations. (Bennett, G.K., Seashore, H.G., and Wesman, A.G., 1959). Tests ability to visualise an object constructed from a given pattern or not and to imagine how the object would appear if rotated in various ways.

NIIP 81 (Slater, 1949). A test of pattern perception and shape dissection. (These two tests were replaced in 1966 by a selection of six tests designed to provide a more comprehensive coverage of 'spatial ability'.)

Myers-Briggs Type Indicator (Myers, 1962). The MBTI is a self-report inventory intended to measure four variables stemming from the Jungian personality typology: extraversion - introversion; sensation - intuition; thinking - feeling; and judging - perceiving. Items are forced-choice alternatives, and consist of behaviour reports, value judgments, and work preferences. Although given at selection in only 1965, it has subsequently been given to architectural students, engineering students and sixth-form schoolboys in studies of personality, ability and interest.

1966

A further new battery of tests was given on 'spatial ability' (French, J.W., Ekstrom, R.B., and Price, L.A., 1963). The tests were:-

The Guilford Zimmerman Aptitude Survey, Part V, Spatial Orientation (Form A). Assesses ability to perceive spatial patterns or to maintain orientation with respect to objects in space.

Cube comparisons Test - S.2. (Adapted from Cubes by L.L. Thurstone) Aims as above.

Paper Folding Test - Vz 2. (Suggested by Punched Holes by L.L. Thurstone). Tests ability to manipulate or transform the image of spatial patterns into other visual arrangements.

Surface Development Test - Vz 3. (Adapted from Surface Development by L.L. Thurstone). Similar aims to Paper Folding Test above.

Choosing a Path - Ss 2. (Adapted from CI401A in the AAF Printed Classification Tests). Aims to test speed in visually exploring a wide or complicated spatial field.

Hidden Figure Test - Cf 1. Assesses ability to keep one or more definite configurations in mind so as to make identification in spite of perceptual distractions.

These tests have not been given subsequently at selection, but an extensive study of spatial ability in architectural students, engineering students and sixth-form schoolboys is currently in progress.

1967/68

In addition to AH5 and DPI, an experimental questionnaire designed to give extra depth to information gathered by the DPI was given.

7. RESULTS OF SELECTION PROCEDURES

Withdrawals and failures among candidates offered a place

As is only too well known to candidates and selectors, several months and important examinations intervene between the moment a candidate is offered a place, and the time he can take it up; the results of the selection procedures which occupied the winter months are not known until the following autumn.

Table 7 shows the outcome of selection of candidates offered places in 1963-67; admissions, withdrawals and failures to qualify in A-level examinations are shown. Of those placing UCL as their first choice, one in nine withdrew, whilst of those not placing UCL first, one in three withdrew; roughly the same proportion of failures (one in seven) occurred in both groups. Although a candidate's choice of university may change after interview, it is evidently more economical to give priority to those placing UCL first on the UCCA form.

The number of those offered places who failed to qualify in their A-level examinations has remained fairly constant at seven or eight although the number of places offered has doubled; (it is to be noted that there was only one failure among the 39 women offered places). We found (see below) that three times as many candidates among those graded A or B on Academic Record, as among those with lower grades, passed their A-levels. We therefore felt justified in giving more weight to the Academic Record, both in final selection, and in screening for interview.

Social Class

Table 8 shows that roughly the same proportion of candidates from each of the social classes was interviewed, but that slightly fewer of those in classes III and IV actually entered the School. Compared with the general university population, a greater proportion of our entrants were from the three upper classes (see Table 2). Since our selection procedure tended to favour the two top classes, the proportion of our entrants in them was higher than in the case of our applicants.

School

Table 9 shows that slightly smaller proportions of candidates from technical and secondary modern schools than from other schools were interviewed, and that a smaller proportion of those from technical and comprehensive schools than from the others entered the School, in the latter case because they withdrew

TABLE 8. Social class: percentage success of application of candidates in each of the Registrar General's five social classes. Men (Great Britain) 1964-66.

Social class	Not interviewed %	Interviewed			Total n
		rejected after interview %	Accepted		
			withdrew or failed to qualify %	admitted %	
I Higher professional	69.1	11.5	9.5	9.9	262
II Managerial and other professional	72.5	9.3	8.5	9.6	364
III Clerical	76.9	8.3	9.1	5.7	264
IV Skilled manual	66.7	18.5	7.4	7.4	27
V Semi- and unskilled	0.0	0.0	0.0	100.0	1
Unclassified	71.4	6.0	16.7	6.0	84
Mean	72.5	9.6	9.6	8.4	
n	726	96	96	84	1002

TABLE 9. Type of school: percentage success of application of candidates from each type of school. Men (Great Britain) 1964-66.

Type of School	Not interviewed %	Interviewed			Total n
		rejected after interview %	Accepted		
			withdrew or failed to qualify %	admitted %	
Independent	73.4	7.9	11.4	7.4	226
Direct grant and grammar	70.2	10.9	9.0	9.9	598
Comprehensive and bilateral	73.8	9.5	16.7	0.0	42
Technical	82.5	6.3	6.3	4.8	63
Secondary modern	79.6	9.3	1.9	9.3	54
Unclassified	75.0	0.0	25.0	0.0	16
Mean	72.5	9.6	9.6	8.4	
n	726	96	96	84	1002

or failed to qualify at A-level; the numbers concerned are however quite small. Compared with the general university population, our entrants included more candidates from technical and secondary modern schools (Table 3).

Academic quality of Bartlett students on admission

The reports of UCCA on the A-level performance of students admitted in 1964-66 to various universities and for various subjects, enabled us to compare the grading of our students with the national norms. Those students who had passed three subjects at the equivalent of Grade C, or two subjects at grade A, A or A, B, were defined by UCCA as "good". The proportion of "good" Bartlett students in cohorts 1960-67 is shown in Table 10a. The national mean of "good" students entering all courses was 60 per cent in 1964 and 1965, rising to 63 per cent in 1966. The national mean of "good" students entering architecture rose from 40 per cent in 1964 to 49 per cent in 1966, which was among the lowest for all the courses included in the UCCA report (UCCA 1965). In this period our proportion of good students rose from 43 per cent to 64 per cent, reaching the national mean for all students, but falling in 1967.

The distribution of numbers of A-level passes among our students in 1960-67 is shown in Table 10b. Overall, 15 per cent had two passes only, the minimum required for entrance to a university. This is similar to the national average for all students. Figures produced by UCCA for 1965 entrants to all universities in the scheme, show that 16 per cent had two A-levels only. 17 per cent of the Bartlett entrants in that year had two A-levels only, but the proportion dropped to half of that in 1966 and 1967.

Predictive value of O-levels for A-level performance

The value of our assessment of Academic Record (based in most cases on O-level results only) for predicting likelihood of passing A-levels has been investigated. We looked at the A-level results of all the men (Great Britain) we interviewed in 1964, and of as many of those not interviewed who were taking A-level maths as could be obtained. We did not include in the sample those who had already taken some A-level subjects, as this would have influenced the grading given on Academic Record. There were 139 candidates in the sample, 51 of the 73 who were interviewed, and 88 of the 159 who were not interviewed. Table 11 shows that performance in A-levels is positively but not significantly ($p < .10$) related to that in O-levels. Of the 52 candidates who were graded A or B on O-levels, 34 (65 per cent) qualified for entry to the Bartlett, and among the 18 graded D and E, only four (22 per cent) did so. It will also be noted that the D and E's failed more severely than the A and B's, the great majority failing to get the minimum university requirement of two A-levels whereas the majority of the A and B's who failed to qualify for the Bartlett achieved two A-levels but failed in Mathematics. We concluded that the incidence of candidates failing to take up places offered, is reduced if attention is paid to previous Academic Record.

Effect of A-level Maths requirement

The decision to require A-level maths or its equivalent for entry to the Bartlett, was made for two reasons. Some of the courses were so designed that

TABLE 10. Academic quality (UCR A-levels) of Barlett entrants 1960-97.

a. Numbers and percentages of "Good" students as defined by UCCA.

Year	n	NA	Good	Not Good	% Good
1960	13	0	4	9	31
1961	18	0	4	7	33
1962	23	0	9	14	39
1963	30	2	13	15	43
1964	31	1	13	17	45
1965	42	0	22	20	52
1966	49	1	20	28	54
1967	45	2	22	21	56
Total	330	6	133	129	60

NA = Not assessable (American or older pre-A-level students).

at least the basic knowledge of mathematics was essential to their understanding. Also it was thought that the practice of some aspects of architecture requires certain basic ways (scientific, objective, logical) of thinking. These were assumed to be correlated with mathematical aptitude, and so were more likely to be present in candidates who had chosen to take A-level mathematics than those who had not.

We examined some of the possible side effects of this regulation.

Figure 2 restricts the size of the population from which we can choose. Table 1 shows that 60 to 100 candidates without maths have applied each year, but the proportion has fallen as the regulation has become more widely known. We feel that the present numbers of eligible candidates are more than enough for our selection procedures to be justified. (It would make very little difference to the numbers available if we made Physics a requirement, as an alternative to Mathematics. In 1994, of the 61 male non-mathematical applicants, only nine were taking A-level Physics; the total we could have chosen from for interview would have been 52 instead of 101.)

The maths requirement does, however, reduce the qualification rate because some candidates pass in two A-levels but fail in maths. Table 2 illustrates this for the 1994 candidates. If maths had not been required, the qualification rate overall would have been 65 per cent instead of 61 per cent, and

TABLE 10. Academic quality (GCE A-levels) of Bartlett entrants 1960/67.

b. Number of A-levels gained

Cohort	n	NA	No. of A-levels						
			5+	4	3	2	1	0	%
1960	12	0	0	3	9	1	12	1	8
1961	15	0	1	1	10	3	12	3	20
1962	23	0	1	5	12	5	18	5	22
1963	30	0	0	6	18	6	24	6	20
1964	31	1	0	3	17	9	22	9	27
1965	42	0	2	6	23	7	25	7	17
1966	40	1	0	9	27	3	34	3	8
1967	41	0	0	8	24	3	42	3	7
Total	220	2	4	45	152	36	201	56	15

NA = Not assessable (American or older pre-A-level students).

TABLE 11. O-level Academic Record and qualification for entry to the Technical School. Men (first Bartlett applicants 1964).

O-level Academic Record	Qualified for entry		Not qualified for entry				Total	
	At least 1 A-level including Mathematics		At least 2 A-levels but failure in Maths		1 or no A-levels		n	%
n = 100	n	%	n	%	n	%		
A + B	26	26	11	11	7	7	44	44
C	28	28	6	6	25	25	59	59
D + E	6	6	1	1	13	13	20	20
Total	60	60	18	18	42	42	100	100

A + B + C + D + E

n = 100

n² = 10,000 n = 100, 100 Total percentage = 100

that of the group with good O-level record (A + B), 86 per cent instead of 65 per cent.

We also considered the possibility that we were selecting a different population in terms of academic potential, by considering only those with A-level maths. We found this was not so. Of 57 ineligible candidates (i.e. no maths) among the 1964 applicants, the proportion who passed two or more A-levels was 70 per cent, compared with 68 per cent of the eligible group. The distribution of numbers and grades of passes was also similar in the two groups (Table 12).

A more serious objection to the maths requirement is that it restricts us to a population with perhaps rather special interests and aptitudes, and excludes another which might contain some potentially useful architects. The educational experience of the eligible group included more scientific subjects at both A- and O-levels than that of the ineligible one, and less History, Geography or English Literature (see p.14 and Table 4b, 4c).

8. TIME SPENT ON SELECTION

The heaviest burden falls on School Office in the Autumn and Spring terms when the major part of a clerk's time is occupied during November through to January processing the applications sent from UCCA, i.e. checking O and A-levels, carding applications, sending out letters for interview, etc. The work gradually slackens off following interviews in January, when candidates are informed of the decisions made on their applications.

The maximum time spent on screening per interview was 200 hours in 1965 when we screened 141 out of 679 applications. The time was reduced when we gave priority to candidates stating preference for UCL., and became more skilled at assessing. In the last year the time amounted to an average of 12 minutes per application fully screened in addition to the administrative work required on the total applications.

The man hours spent by the teaching staff in the Board interview in 1965 was similar to the time spent in 1965 and 1966 with the system of three interviews (i.e. roughly 220 hours which includes time spent in discussion). (The time spent in 1964 was greater because there were four interviews instead of three, followed by a board meeting with Professor.) In 1967 and 1968 with the single interview system the time was reduced to about 62 hours.

9. INTERRELATIONSHIPS OF CHARACTERISTICS OF INTERVIEWEES, 1964-68

The selection procedure used in the three consecutive years 1964-68 made it possible to study in some detail the interrelationships of the criteria which affected the final decision about offering a place, i.e. Academic Record at Application (AR), School's Report (SR), Candidate's Statement (CS), and interview grades, and the relationship of these to performance on two

TABLE 12. Academic Record at O-level and global grade of A-level performance*

O-level Academic Record Candidates taking A- level Maths n = 139	A-level performance (see below*)												TOTAL	
	A		B		C		D		Total pass		E Failed to gain 2 A- levels			
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
A + B	0	0	4	8	22	42	19	37	43	87	7	13	52	100
C	2	3	5	7	11	16	26	38	44	64	25	36	69	100
D + E	0	0	0	0	0	0	5	28	5	28	13	72	18	100
Total	2	1	9	7	33	24	50	36	94	68	45	32	139	100
Candidates not taking A-level Maths n = 57	0	0	6	10	13	23	21	37	40	70	17	30	57	100

* Global scale for A-level performance:

A = at least 3 high A-level results, i.e. A or B grades

B = at least 2 at A or B grades

C = at least 2 at C or 1 A/B + C/D

D = less than 2 passes at C grade

E = less than 2 passes at A-level

Candidates graded A - D would qualify for entry to Bartlett if one of the passes was in Maths. The number gaining 2 A-level passes but failing in mathematics is given in Table 11. Candidates graded E would not qualify for entry to a university.

psychological tests. Among the tests which were administered to candidates on the interview day (but not used for selection), two were given in all three years, and will be reported here; AH5, a test of general intelligence and reasoning ability, and DPI, the Dynamic Personality Inventory. The three paper qualifications were each graded before the interview on a scale A - E, (using also intermediate grades giving ten points) by one of us (SH) and checked by another (MLJA). The tests were administered and scored by a third member of the unit in ignorance of the paper qualification or interview gradings of the testees (in 1964/5 by M. C. Tyson and in 1966 by P.S.). The interviewers were members of the teaching staff.

It should be made clear, that although it was our intention in setting up this arrangement, to collect information which could be used to evaluate the various criteria, and especially to ascertain whether the immensely costly interview was justified, we kept the conditions as "natural" as possible. The interviewers were not asked to make their judgments "blind"; on the contrary, they were encouraged to study the application forms and become familiar with the candidate's grades on AR App., RR, and CS. It is impossible to say, therefore, to what extent the various individual interviewers' judgments were already influenced by these other criteria. Further, when the team discussed their combined recommendations, they might use the paper qualifications to varying extents to help to decide between otherwise seemingly equal candidates. As described above, in the earlier years we regarded the interviewers' function as that of making a crucial judgment about candidates who, having been selected for interview on paper qualifications, were then to be differentiated by personal contact. Later, as the study of the earlier cohorts gave increasing evidence of the importance of Academic Record as a predictor of success in qualifying for admission and in performance at the Bartlett, we recommended that differences between interviewee's grades on this should be considered in the final judgment, and still later, those on RR and CS also. The extent to which the paper qualifications consciously or subconsciously affected the interviewer's assessment and the team's final judgment would therefore vary as between interviewers, between teams and between the successive years.

In the discussion that follows, we consider a population of 260 male candidates between seventeen and twenty years old, and educated in Great Britain, who were interviewed during 1964-66; 70 were interviewed in 1964, 101 in 1965, and 89 in 1966 (older men, women and overseas candidates were eliminated from this population in the interests of homogeneity). The candidates had been selected for interview from a total of 1,058 male applicants educated in Great Britain.

Final interview decision and paper qualifications

Table 13 gives the correlations of paper qualification grades with the final interview decision of acceptance or rejection of the applicant. In order to minimize the problem of possible unreliable scaling of AR App., RR and CS over the three years, and to simplify the picture, each criterion had been dichotomized as nearly as possible as 'high' or 'low'. It will be seen that there is an increase in the relationship rising from virtually no correlation in 1964 to .10 for CS, .16

for AR App. and .52 for RR, the two latter being significant in 1966. This probably reflects the change in policy to take account of paper qualifications at the final interview decision, as well as at selecting for interview. Table 13 also shows that AR App. and RR are positively correlated, significantly so in 1965 and 1966, but that CS is not strongly nor consistently related to either.

The relationships between offer of a place after interview, and the paper qualifications, has been demonstrated for the three years combined in another way. Table 14 shows that RR and CS, but not AR App. were significantly related to the interview decision to offer a place, i.e. that the interviewers were reacting more to "personality" than to academic ability.

With the three dichotomized measures it is possible to distinguish eight different categories of candidates. These are shown in Table 15, together with the numbers in each category who were, and were not offered a place. The categories are listed in order of their effectiveness in distinguishing successful candidates. It is clear that the difference between the extremes (all three criteria high or all low) is marked, but also that where RR and CS are alike and different from AR App., the acceptance rate is almost the same as when all three are alike (compare columns 1 with 2 and 7 with 8).

It is also clear that no combination of these measures within the interviewed population reflects the interview decision sufficiently well to serve as a useful alternative. Of the 55 candidates with both high RR and high CS, two-thirds were offered places, and of 80 candidates with low RR and low CS one-third was offered places, i.e. there would have been in both cases one "miss" for every two "hits" compared with the interview decision. (It is possible to improve the "hit" rate somewhat by discriminant analysis, a technique which produces a linear combination of the paper qualifications so as to maximise the 'a priori' accept/reject classification. However, in the interests of simplicity this will be presented elsewhere.)

If the absence of a measure or measures to duplicate the interview decision means that the interview procedure should continue, the most useful advice would be to save some unnecessary labour by not interviewing candidates with both a low RR and low CS.

TABLE 13. Intercorrelations of paper qualifications and acceptance-rejection of interviewees (Men, Great Britain) 1964-66.

	n	RR	CS	Accepted/ Rejected
Academic Record 1964 on application	70	39	-29	07
	1965	42*	-13	-07
	1966	46*	09	36+
Referee's Report	1964		04	06
	1965		10	27
	1966		-05	52*
Candidate's Statement	1964			04
	1965			29
	1966			30

n = 260 (Tetrachoric r, decimal points omitted).

+ p < .05, * p < .01

TABLE 14. Relation between offer of place, and dichotomised paper qualifications. Interviewees (Men, Great Britain) 1964-66.

Interviewees	Academic Record (App) n = 260		Referee's Report n = 260		Candidate's Statement n = 258*	
	High	Low	High	Low	High	Low
Accepted	70	52	67	55	65	57
Rejected	68	79	59	66	59	66
χ^2	1.677		9.185		7.796	
P	NS		< .01		< .01	

* No statement was available for 2 candidates

TABLE B. Relation between offer of place, and combinations of dichotomised paper qualifications.
 Interviewees (men, Great Britain) 1964-66.

Paper qualifications	1	2	3	4	5	6	7	8
Academic record	low	high	low	low	high	high	low	high
Interviewer's report	low	low	high	low	low	high	high	high
Candidate's statement	low	low	low	high	high	low	high	high
	42	38	21	39	21	42	18	37
Candidates								
Accepted	13	14	9	18	10	22	12	25
Rejected	29	24	12	21	11	20	6	12
Accepted	27						37	
Rejected	53						18	
Total n = 256 *	80			123			55	

* No Candidate Statement was available for 2 subjects

Individual interviewer's assessments and paper qualifications

The arrangement of the interview procedure, whereby each candidate was rated by three independent interviewers on three separate scales in addition to the overall judgment, makes it possible to answer several interesting questions that are important in any interview situation. The answers do not have general significance, of course; they simply add to our description of what was happening in the selection interview procedure during these three years at the Bartlett.

(Ten candidates of our population of 260 are not considered here because they were interviewed by a team which in the main saw female and overseas applicants, and in this section we are interested only in those who saw a substantial number of candidates.)

Table 16 reports the correlations between the individual interviewer's global grades and the three dichotomized measures derived from the UCCA form.

Variation between interviewers, and in any one interviewer from year to year, is marked (see Table 16), but in the majority of cases there is a tendency for the correlations with paper qualifications to be higher in the last year. Again, CS and especially RR are more closely related to interview ratings than is AR. The correlations with AR range from $-.21$ to $.26$ and none is significant; those with RR range from $-.09$ to $.57$ and in four cases are significant at $p < .01$, and those with CS range from $-.15$ to $.34$ and two reach significance at $p < .05$. The tendency for greater correlation with RR may indicate that the interviewer placed greater value on RR than on CS as a source of relevant information (as stated above, we cannot know how far the interviewer deliberately took note of the RR and CS). An alternative interpretation is that the interviewer sees the candidate more as his referee sees him than as he sees himself or wishes to present himself.

Relation between interviewers' assessments

To what extent did the interviewers agree with one another in their ratings of candidates? Table 17 gives the intercorrelations of their ratings on the three scales (2, 5, 6) which all interviewers used. The picture is of teams of interviewers who have a basis of broad general agreement, while leaving room for variations of individual judgment. In ten of the twelve cases there is more agreement about a candidate's "range of interests and appetite" than about his "personal likability". There is broad agreement between the interviewers conducting Interview 1 (general assessment) and Interview 2 (design ability), and less between them and the interviewers conducting Interview 3 (scientific ability). All five cases of lack of significant agreement over the global grade involve the scientific interview.

TABLE B. Correlations (biscerial) between individual interviewer's global rating and paper qualifications of candidates.
Interviewees (Men, Great Britain) 1964-66.

Interviewer	Year	Interview	Interviewees	Academic Record (App.)	Referee's Report	Candidate's Statement
A	1964	1	70	.07	.06	.34+
	1965	1	57	.15	.23	.28
B	1964	3	70	.04	-.09	.02
	1965	3	64	-.21	.16	.17
	1966	1	38	.26	.57*	.11
C	1964	2	70	.02	.05	-.01
	1965	2	64	-.10	-.04	.31+
	1966	2	38	.19	.04	.34
D	1965	3	40	-.12	.29	.18
	1966	1	37	.02	.22	.21
E	1965	1	39	.24	.47*	-.15
	1966	2	37	.26	.54*	.07
F	1965	2	39	.07	.14	.30
	1966	3	30	-.04	.52*	.32

Note: Type of interview is explained on p.23.

* $p < .01$ + $p < .05$

TABLE 17. Correlations (product-moment) between pairs of interviewer's gradings of candidates. Interviewees (Men, Great Britain) 1964-66.

Interviewers	Interview numbers	Interview ratings		
		Range of interests; Appetite (2)	Personal Likeability (5)	Global Grade (6)
<u>1964</u>				
A + B	1 + 3	.37*	.28+	.50*
A + C	1 + 2	.36*	.24+	.48*
B + C	3 + 2	.36*	.18	.40*
(n = 70)				
<u>1965</u>				
A + B	1 + 3	.41*	.12	.41*
A + C	1 + 2	.12	.04	.11
(n = 57)				
B + C	3 + 2	.30+	.05	.13
(n = 64)				
E + F	1 + 2	.39+	.26	.43*
(n = 37)				
E + G	1 + 3	.42+	.47*	.63*
F + G	2 + 3	.30	-.01	.38+
(n = 30)				
<u>1966</u>				
B + C	1 + 2	.37	.26	.27
B + D	1 + 3	.41+	.32+	.39+
C + D	2 + 3	.35+	.38+	.18
(n = 20)				
E + F	1 + 2	-	-.24	-.08
(n = 20)				

* $p < .05$ + $p < .10$

Note: Type of interview is explained on pp. 13-14.

TABLE 18. Correlation (product-moment) between the global grade given by each interviewer and his partial grades. Interviewees (Men, Great Britain) 1964-66.

Interviewer	Year	Interview Number	Interviewees	Interview ratings				
				1	2	3	4	5
A	1964	1	70	.94	.95			
	1965	1	57	.93	.95	---	---	.77
B	1964	3	70	---	.87	---	.84	.77
	1965	3	64	---	.76	---	.86	.77
	1966	1	38	.83	.88	---	---	.82
C	1964	2	70	---	.81	.86	---	.80
	1965	2	64	---	.84	.83	---	.75
	1966	2	38	---	.90	.92	---	.83
D	1966	3	40	---	.81	---	.76	.83
E	1965	1	37	.77	.72	---	---	.69
	1966	1	39	.90	.84	---	---	.74
F	1965	2	37	---	.88	.89	---	.77
	1966	2	39	---	---	.89	---	.75
G	1965	3	30	---	.98	---	.83	.64

Interview ratings

1. Sensitivity to environment
2. Range of interests
3. Ability to organize conceptually
4. Ability to organize concretely
5. Likability

Type of interview is explained on pp. 23-24.

All correlations significant at $p < .01$

"Likeability" and interviewers' assessments

One of the problems in interviewing is the difficulty of disentangling one's subjective feelings for the candidate as a person, from one's assessment (hopefully less subjective) of his perhaps more relevant characteristics. Table 18 gives an indication of the extent to which the Bartlett interviewers may have been influenced in their global judgment by the candidate's likeability. The correlations of the global grade with each of the other three ratings are given for each interviewer in each year. Although there is a very clear and marked 'halo effect' underlying these correlations, those of personal likeability with the global grade are generally lower than those with the other four ratings (there are only two exceptions in the fourteen cases in Table 18). It seems that the interviewers may have been making an attempt to partial out likeability from their judgments.

AH5 and selection criteria

AH5 is a high-level test of general reasoning ability, designed for use primarily with university students and comparable populations. It is in two parts - the first has verbal and numerical items, the second non-verbal items. There are separate scores for the two parts, and a total score.

Table 19 gives the mean raw scores of the 260 candidates in our sample. The mean total score is significantly higher than the university student norm ($p < .01$). This difference is due to the superiority of the architectural candidates on Part II ($p < .01$) of the test, that is on the non-verbal items; on Part I their mean score is significantly lower than the norm. Table 20 gives the expected and obtained frequencies of candidates in each of the five grades of AH5; (the distribution of the student norm population, is 10 per cent in each of B and D, and 40 per cent in C). The candidates' distribution is clearly negatively skewed for Part I of the test, and highly skewed positively for Part II.

Table 19 also indicates the relationships between AH5 scores (expressed as sample stems, i.e. on a 0 - 9 scale with a mean of approximately 4.50, and a standard deviation of about 2.00) with paper qualifications, and the interview decision. The mean AH5 scores of candidates with high grades on AR or on RR are higher than of those with low grades, but the differences do not reach significance except for that between high and low RR on Part II ($p < .05$). In the case of CS, the AH5 means of those with high and those with low grades are almost identical. The candidates who were offered places had a significantly higher mean total score, due mainly to a higher mean score for Part I, (verbal and numerical items), than those rejected.

TABLE 19. AH5 mean raw scores of interviewees, acceptees and norms; and relation of mean stens to high and low paper qualifications, and offer of a place. Interviewees (Men, Great Britain) 1964-66.

	AH5 Scores					
	Part I		Part II		Total	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Raw scores						
norms n = 946	19.14	4.56	19.94	4.98	39.06	8.26
interviewees n = 260	17.91	3.64	23.54	3.52	41.45	5.86
t (significance of difference from norms)	4.55*		13.23*		5.28*	
acceptees n = 123	18.49	3.40	23.88	3.73	42.37	5.77
t (significance of difference from norms)	NS		10.52*		5.63*	
Stens						
high AR n = 139	4.68	2.10	4.67	1.81	4.70	1.98
low AR n = 121	4.24	1.84	4.56	1.95	4.34	1.89
t (significance of difference between groups)	NS		NS		NS	
high RR n = 118	4.66	1.97	4.88	1.86	4.75	1.97
low RR n = 142	4.32	2.00	4.40	1.86	4.35	1.91
t (significance of difference between groups)	NS		2.06+		NS	
high CS n = 115	4.45	2.15	4.61	2.01	4.54	2.06
low CS n = 143	4.50	1.87	4.63	1.76	4.52	1.86
t (significance of difference between groups)	NS		NS		NS	
accepted n = 123	4.85	1.94	4.76	2.00	4.85	2.02
rejected n = 137	4.15	1.98	4.50	1.76	4.25	1.84
t (significance of difference between groups)	2.86*		NS		2.47+	

+ $p < .05$ * $p < .01$

TABLE 20. Expected and obtained frequencies of AH5 grades.
Interviewees (Men, Great Britain) 1964-66.

n = 260

Grade	Expected frequency	Obtained frequency		
		Part I	Part II	Total
A	26	9	56	20
B	52	27	109	78
C	104	131	79	120
D	52	66	16	34
E	26	27	0	8

Table 21 gives the biserial correlations of AH5, paper qualifications and final decision for the three years (1964-66) separately. It shows that there are no significant correlations between AH5 and Academic Record, except in the case of AH5 I in 1966 ($p < .05$). Relationships of AH5 with Referee's Report are negligible in 1964/6, but in 1966 were significant at $p < .01$ for Part I and for Total, and at $p < .05$ for Part II. There is consistently scarcely any relationship with Candidate's Statement. There is no significant relationship of AH5 with the final decision about offering a place in 1964, (indeed the correlation coefficients are negative) but in 1965 and 1966 AH5 I and Total are significantly related ($p < .01$) with the decision.

The result of the total selection procedure was to offer places to a group of candidates who had significantly ($p < .01$) higher AH5 total score than the student norms. This was due to a considerably higher mean score on AH5 II; the mean score on AH5 I was a little lower than the norm, though not significantly so (Table 19).

TABLE 2L. Bi-serial correlations (decimal point omitted) of AH5 scores with Academic Record (App.), Referee's Report, Candidate's Statement and offer of place. Interviewees (Men, Great Britain) 1964-66.

	Academic Record			Referee's Report			Candidate's Statement			Accept/Reject		
	1964	1965	1966	1964	1965	1966	1964	1965	1966	1964	1965	1966
AH5 I	05	10	25+	12	-07	34*	04	07	-06	-18	36*	40*
AH5 II	05	10	-00	-06	12	31+	-10	06	-04	-11	16	14
AH5 T	03	15	16	01	02	34*	-06	08	00	-15	30*	35*
n	70	101	89	70	101	89	70	99	89	70	101	89

+ p < .05 * p < .01

Dynamic Personality Inventory (DPI) and paper qualifications

The Dynamic Personality Inventory is not a well-known nor widely used test. It consists of 325 items, which include a wide variety of objects, activities or concepts, which can be associated with a number of personality traits. The person doing the test marks his reaction to these items in terms of like or dislike, according to his first reaction. He is encouraged to give free rein to his imagination and to react in an immediate and spontaneous way to images which the items conjure up. In this respect the DPI is more like a projective test than other 'question-and-answer, yes-no' personality tests. This feature has been an advantage when testing highly intelligent and critical young men and women. In general they have enjoyed doing the DPI and have not felt affronted by it. But when we have given them some of the more well-known tests, which appear to ask highly specific and veridically-slanted questions about their experiences and behaviour, they have often felt that these tests were naive, insulting and impossible to answer with any degree of confidence.

In its construction the DPI follows a psychoanalytic approach to the theory of personality, and its 33 scales (see Table 22) fall into a number of groupings which correspond to various patterns of psychosexual development. When looking at test scores or profiles it is often useful to focus on these groups of scales, whether or not one is seeking a psychoanalytic interpretation. Five important groups are the 'oral' (in non-psychoanalytic terminology this would be 'outgoing emotionality and self-assertion'), and 'anal' (obsessiveness and authoritarianism), 'phallic' (sensuality, imagination and ambition), 'mature social interests' (identification with the roles of one's own sex, tendency to participate in social activities), and 'ego-strength' (persistence and initiative). We shall draw attention in particular to the first three groups.

It should be stressed that in this monograph we have not looked for psychoanalytic interpretations of the DPI, and do not justify its use by such intentions. We have interpreted the test simply in terms of the content of its items, and justified its use by its face validity and, after the event, by its power to pinpoint consistent and intelligible individual differences.

It is to be noted (Stringer and Tyson 1968) that our 260 candidates as a body showed a wide range of personality differences from the general population of students on whom the test norms are based. On 15 scales the significance of the difference between the candidates' mean score and the norm is $p < .01$ and on three scales $p < .05$ (Table 22 - col. 1 and Fig. 3). Column 2 of Table 22 shows the rank order of relative elevation of the candidates' mean score on each scale in terms of the standard normative scores for the general student population. It will be seen, for instance, that in their 'tactile and handicraft interests' (TI) the candidates most exceeded the norm, and in 'authoritarianism' (As) they were most below the norm.

The mean scores on each of the 33 DPI scales of interviewees with high and low scores on Academic Record on application, Referee's Report and Candidate's Statement, and of those accepted and rejected are illustrated in Fig. 3 a - d.

TABLE 22. DPI and interview

DPI Scale	1	2	3	4
H Hypocrisy, social conformity	4.49*	32	31	19
Wp Liking for passivity	5.12+	23	13	31
Ws Liking for seclusion	5.38	21	21.5	16.5
O Orality	4.50*	31	28	10
OA Oral aggression	5.66	10	17	11
Od Emotional dependence	4.56*	30	8.5	30
Om Need for movement	5.85+	6.5	13	4
Ov Verbal aggression	5.44	19.5	26.5	13
Oi Impulsiveness	5.48	18	4	24
Ou Unconventionality	6.27*	4	3	5
Ah Hoarding	5.07*	24	15.5	26
Ad Attention to details	5.49	17	30	28
Ac Conservatism	4.85*	27	21.5	33
Aa Submissiveness to authority	4.60*	29	32	29
As Authoritarianism	4.35*	33	33	32
AI Insularity	5.32	22	25	27
P Phallic symbols	5.72	8	21.5	23
Pn Feminine narcissism	5.44	19.5	11	25
Pe Exhibitionism	4.95*	26	6	12
Pa Drive for achievement (active)	6.04*	5	21.5	21
Ph Drive for achievement (passive)	5.61	13	6	16.5
Pf Sensitivity and imagination	5.52	15	6	8
PI Interest in exploration and adventure	5.63	11	24	7
S Sexuality, lack of sexual repression	6.45*	2	1	14
TI Tactile and handicraft interests	7.27*	1	10	9
CI Creative interests	6.28*	3	2	1
M Masculinity	5.85+	6.5	29	18
F Femininity	5.00*	25	8.5	2
MF Liking for social roles	5.50	16	26.5	3
SA Liking for social activities	5.53	14	13	20
C Interest in children	4.80*	28	18.5	15
EP Ego-defensive persistence	5.62	12	18.5	22
EI Initiative	5.71	9	15.5	6

Intercorrelation (Spearman rho) of cols. 2 and 3 $p < .05$ 0.39
 2 and 4 $p < .01$ 0.48
 3 and 4 $p < .05$ 0.34

1. Mean standard scores on DPI scales (norm = 5.50) (n = 260)
2. Order of relative elevation of candidates' mean standard scores (student norms) (n = 260)
3. Order of relative elevation of interviewers' mean standard scores, (adult norms) (n = 7)
4. Order of average correlation of interview ratings with candidates' DPI scores (n = 250)

t test of significance of difference from norms. + $p < .05$; * $p < .01$

There are no significant differences between any of the mean DPI scores of the high and low Academic Record groups (Fig. 3a).

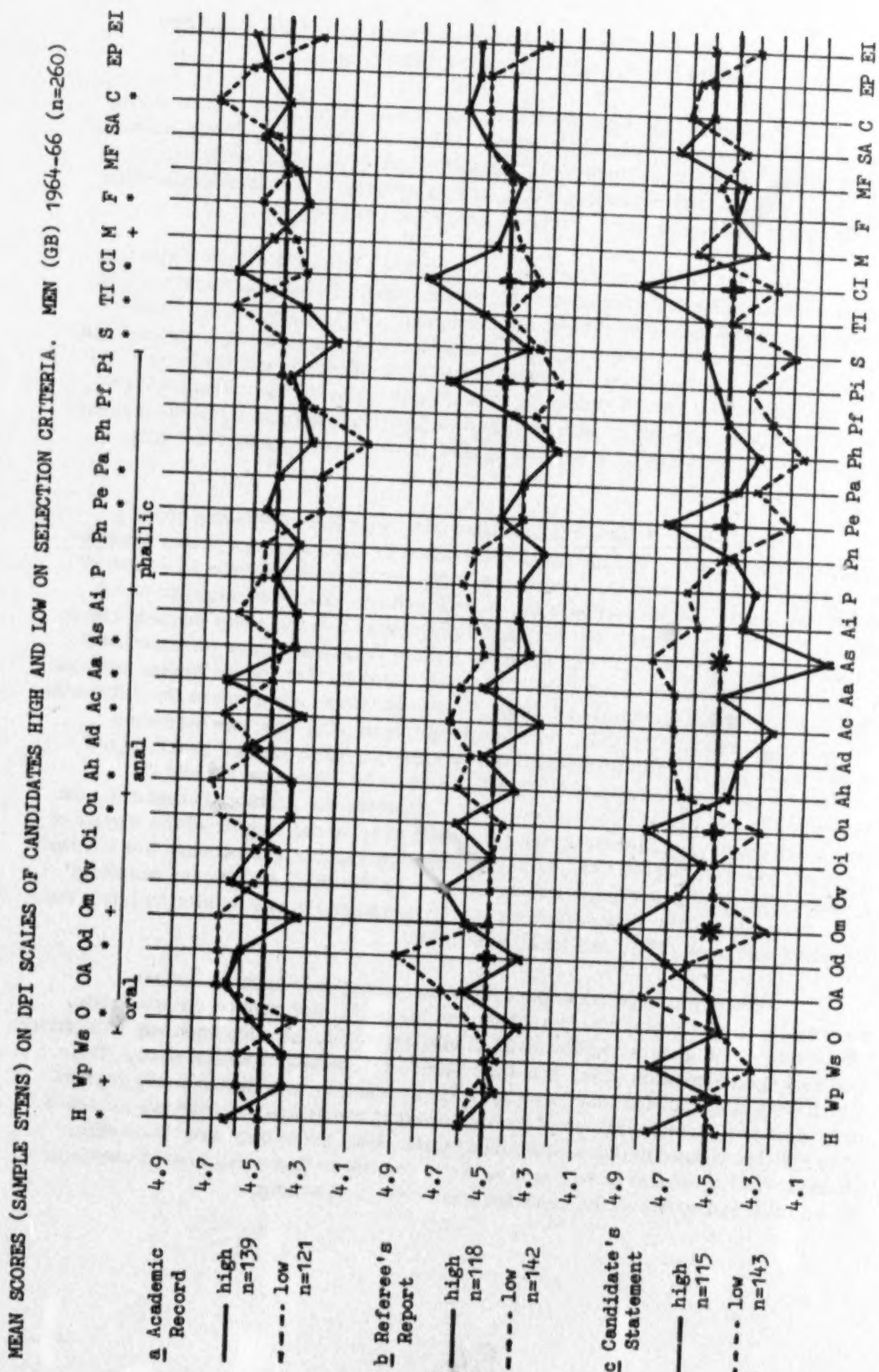
Interviewees with high grades on Referee's Report tend to have lower scores on all the 'Anal' scales ('hoarding', (Ah), to 'insularity', (Ai)), compared with those with low grades, and to differ significantly ($p < .05$) from them in being less 'emotionally dependent' (Od), having greater 'interest in exploration and adventure' (Pi), and more 'creative interests' (CI) (Fig. 3b).

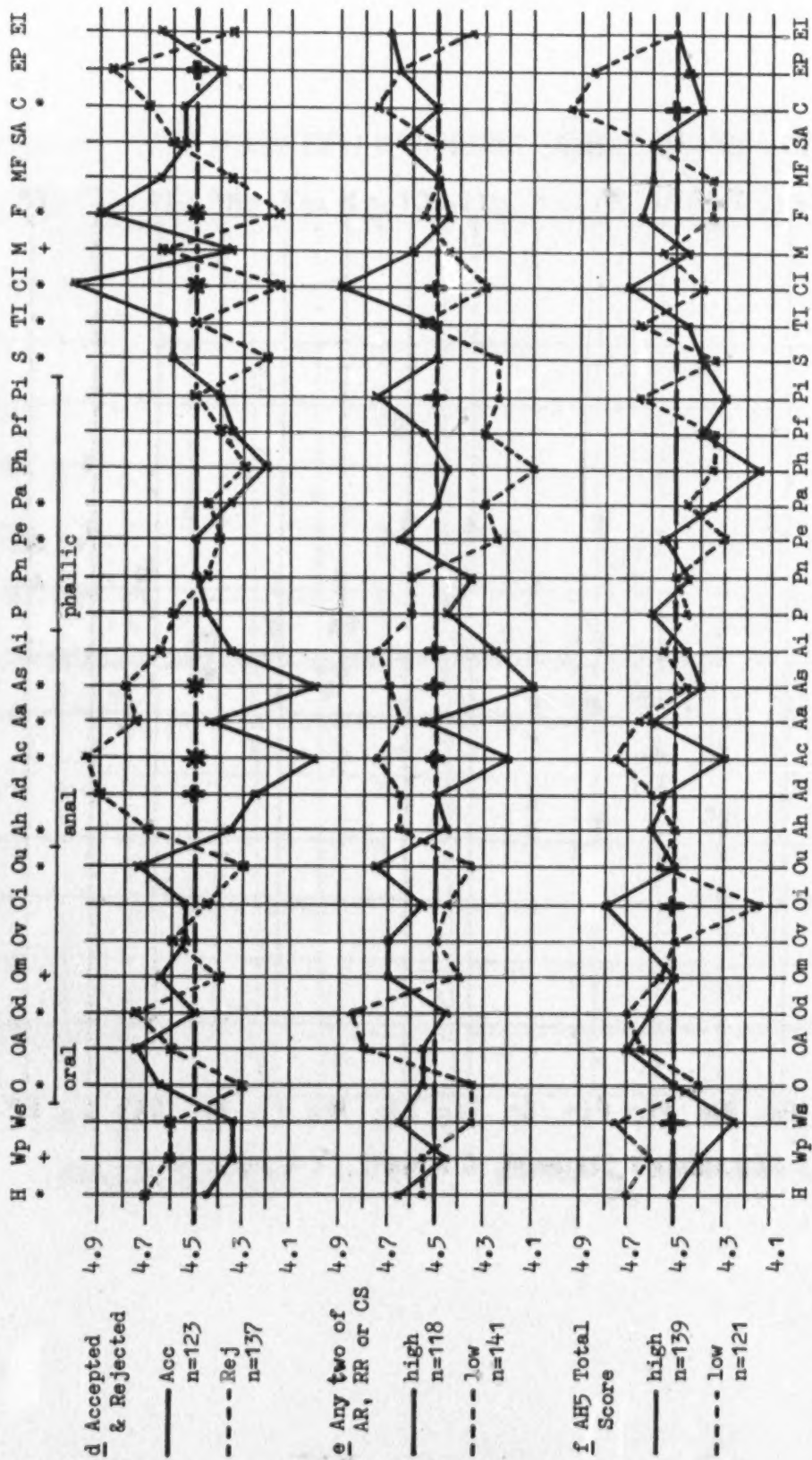
The group with high grades on Candidate's Statement differs from that with low ones, in having consistently higher scores on five of the "Oral" scales, 'emotional dependence' (Od), 'need for movement' (Om), 'verbal aggression' (Ov), 'impulsiveness' (Oi) and 'unconventionality' (Ou), and on eight scales from 'exhibitionism' (Pe) to 'creative interests' (CI). It differs significantly ($p < .01$) from the group with low CS grades in having greater 'need for movement' (Om), and in being less 'authoritarian' (As); and ($p < .05$) in being more 'unconventional' (Ou), more 'exhibitionistic' (Pe), and having more 'creative interests' (CI), (Fig. 3c).

The two sets of DPI profiles associated with RR and CS are broadly similar in appearance, except that the elevation or depression of points tends to be greater in the CS profile. There are only four cases among the 33 scales in which the sign of the difference between high and low groups is opposite in RR and CS (on six other scales the high and low groups have the same mean in either RR or CS and not in the other). There is a substantial difference on 'emotional dependence' (Od) in which not only is the sign opposite, but the difference between high and low on RR is significant at $p < .05$. In the three other cases the differences are small, ('masculinity' (M), 'interest in children' (C), and 'ego defensive persistence' (EP)). The profiles of the two groups differentiated by AR do not match especially well those of the groups defined by scores on RR and CS. Nevertheless, of the 33 scales there are 17 in which the scatter of means for the three high paper qualification groups does not overlap the scatter of the means of the three low groups (Fig. 4). In seven cases the differences between the clusters of three high means and three low means is considerable, ('liking for passivity' (Wp), 'hoarding' (Ah), 'conservatism' (Ac), 'insularity' (Ai), 'exhibitionism' (Pe), 'creative interests' (CI), and 'initiative' (EI)).

These relationships depend, of course, not only upon the referee responding to particular characteristics in his pupil, not only on the candidate projecting particular characteristics in his statement, but also upon any selectivity that may have operated in the grading of these two pieces of information. The Bartlett staff concerned may have been predisposed to rate higher those reports or statements giving evidence of particular characteristics, which gave evidence of particular characteristics measured by the DPI; there may have been other characteristics measured by the inventory, for which there was also evidence in RR and CS, but to which the assessors were not responding.

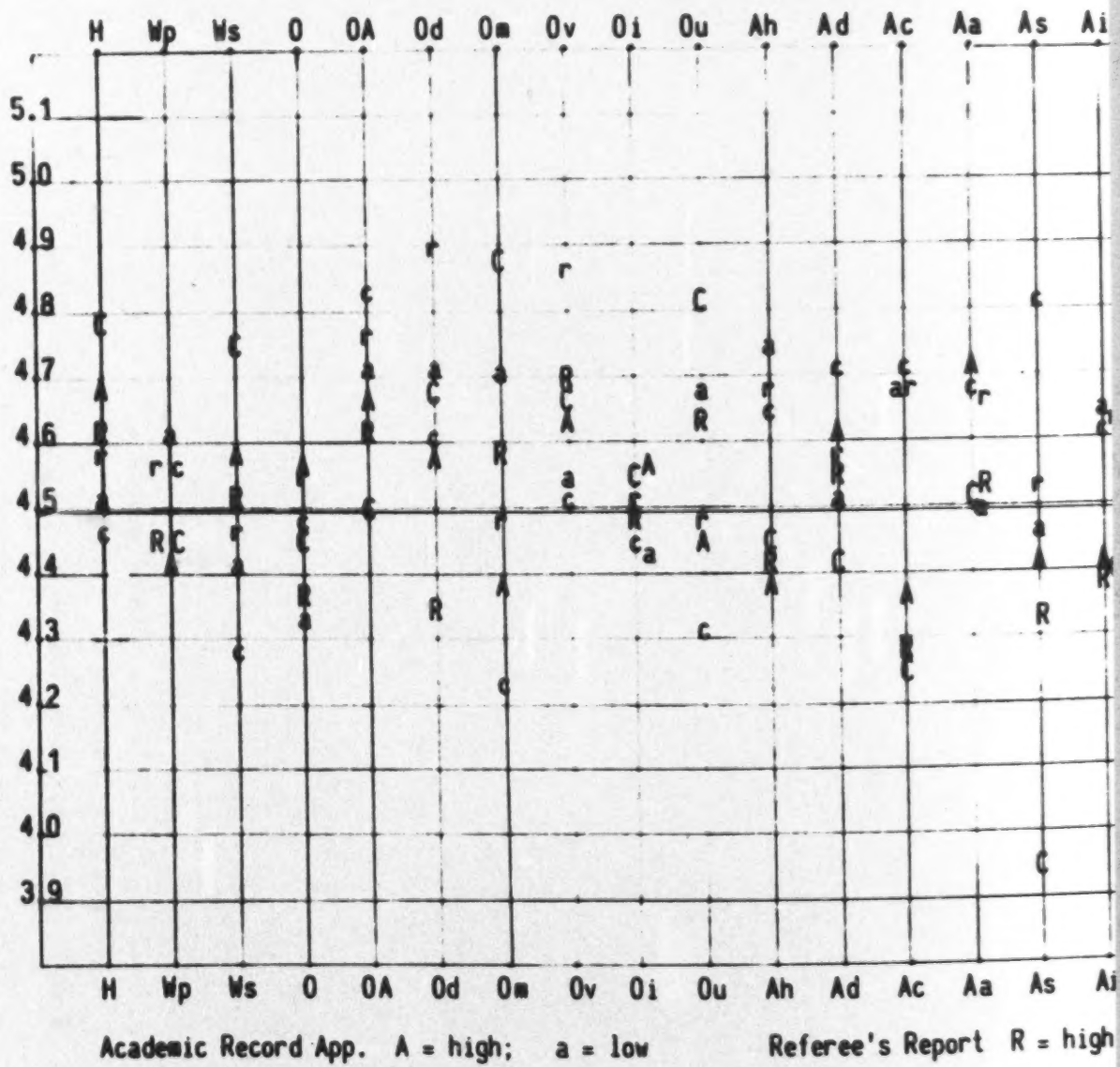
Figure 3



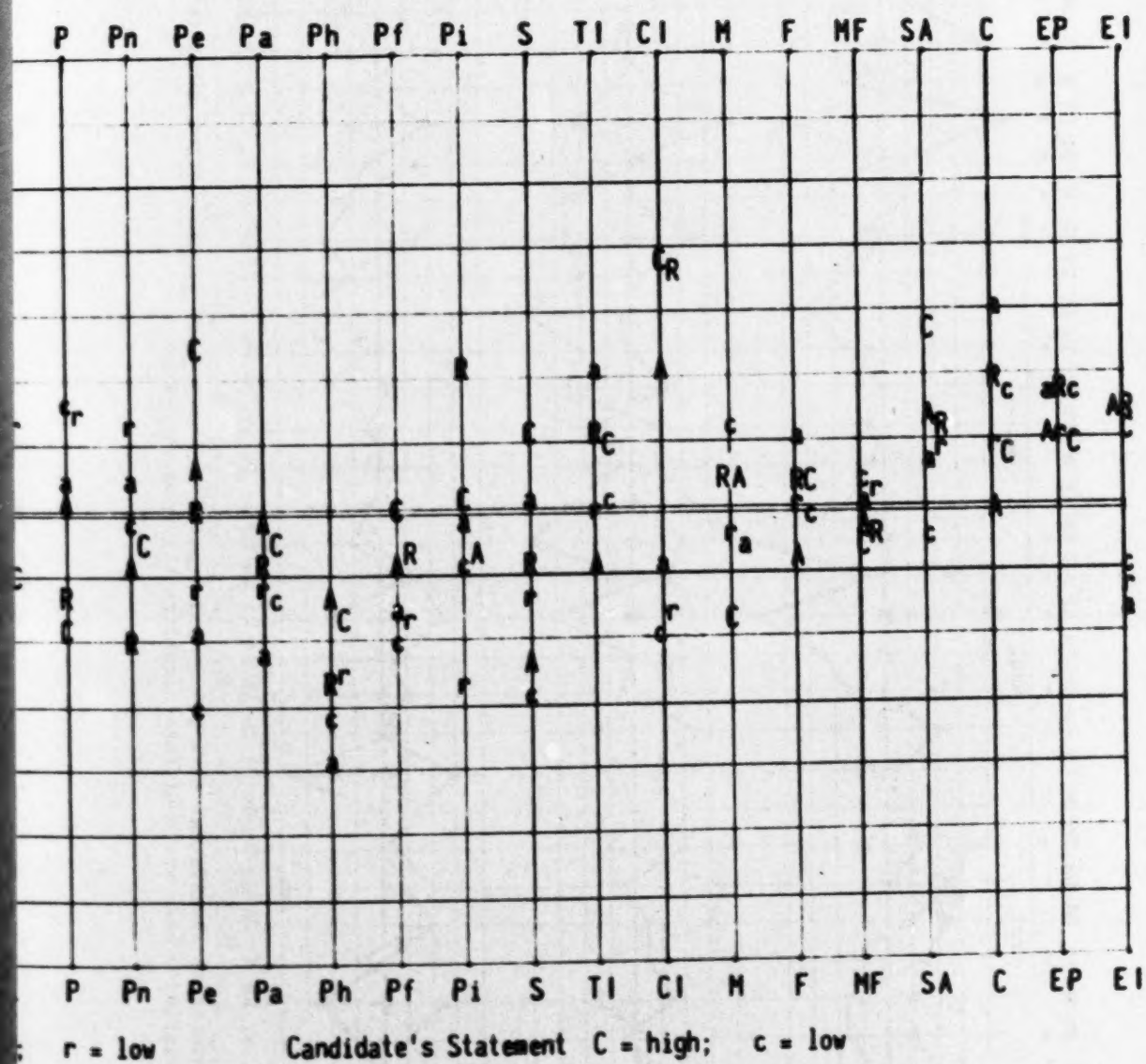


Differences between group means significant at $p < .05$ and $p < .01$. Above a and d, these signs indicate the scales on which the total population's mean score differs significantly from the norms.

Figure 4 MEAN SCORES (DPI) OF CANDIDATES WITH HIGH (+) AND LOW (-) PAPER QUALITY



IFICATIONS. Men (GB) 1964-66 (n=260).



The relationships between DPI scores and paper qualification measures may be more complex than appears if the measures are considered separately. When the personality scores of candidates in the eight categories formed by the different combinations of the three dichotomized paper qualifications are compared, some interesting points emerge. Candidates with high AR, and low RR and CS, that is those who have only their Academic Record to recommend them particularly, tend to differ from those who are low in AR, but high in RR and CS, in being more conventional, having less liking for seclusion, being less interested in movement, change, exploration and adventure, in having less freedom from sexual repression, and being more authoritarian. Candidates with high RR, and low AR and CS, tend to be more insular and authoritarian, and less introspective, unconventional, exhibitionistic and ambitious, than those with low RR, and high AR and CS.

A large number of other comparisons could be made between various categories. Any apparent differences should be treated very tentatively, however, since even the larger differences in mean scores for individual scales are not always significant, the numbers in the groups being so small. Nevertheless the profiles quoted do suggest an interesting and intuitively plausible picture. The possibility that particular patterns of candidates' personality characteristics may be involved in our use of paper qualification measures will be investigated more fully in the larger group of candidates for the six years 1964-69.

Dynamic Personality Inventory and Interview

Since it is likely that the candidates project their self-image, at least in part, either deliberately or inevitably during the interview, it is interesting to note how the interviewer's rating relates to DPI scores. Where a relationship is observed, it may not be concluded that the interviewer was actually searching for evidence of the characteristic in question. Indeed, it is not even possible to decide whether such relationships are due to the candidates influencing the interviewers with some exercise of the particular characteristic, or whether the characteristic is only incidental to a more general ability to impress interviewers.

Column 4 of Table 22 gives the average rank order of the correlations between the candidates' final grades at interview and their DPI scores. It will be seen that the five attributes most highly favoured by the interviewers are 'creative interests' (CI), 'femininity' (F), 'liking for social roles' (MF), 'need for movement' (Om) and 'unconventionality' (Ou), whilst the five least favoured are 'conservatism' (Ac), 'authoritarianism' (As), 'liking for passivity' (Wp), 'emotional dependence' (Od), and 'submissiveness to authority' (Aa). As a result, candidates offered a place at the Bartlett differed significantly from those rejected, on their scores for six personality measures. They had higher scores ($p < .01$), for 'creative interests' (CI) and 'femininity' (F), lower scores ($p < .01$), for 'conservatism' (Ac), 'authoritarianism' (As), and lower scores ($p < .05$), for 'attention to details' (Ad), and 'ego-defensive persistence' (EP).

Fig. 3d shows the differences between the means on all the DPI scales, of candidates offered a place and those rejected. The most striking feature is the wide separation of the two profiles over the whole group of 'anal' scales, the

accepted candidates being significantly lower than the rejected ones on three of them.

One of the most interesting features is that few of these relationships emerge from comparing the ratings of individual interviewers with the candidates' self-images. It seems rather that a group or institutional selection mechanism ensures that successful candidates have particular characteristics, the considerable variations in the responses of individual interviewers and of the same interviewer from year to year notwithstanding.

A question not discussed in the paper by Stringer and Tyson, is whether the interviewers were looking for students who were like themselves. It is not easy to get evidence to answer this question, and the present study was not designed to provide it. However, there is a little relevant information which is worth looking at.

The seven interviewers were asked to take the DPI, and Table 22, column 3, gives for them the rank order of relative elevation of the mean scores on each scale in terms of standard, normative scores for the general adult population on the scales, i.e. information comparable to that given for the candidates in column 2. Comparing columns two and three we note a general similarity in the characteristics which mark relative peaks and depressions in the two profiles, of candidates and interviewers. Notably, both are relatively high in 'creative interests' (CI) and 'unconventionality' (Ou); and low in 'authoritarianism' (As), 'submissiveness to authority' (Aa), 'hypocrisy and social conformity' (H), and 'orality' (O). (The lack of sexual repression shown by both groups is probably due to some extent to the change in sexual values during the decade since norms were established.) Evidence for the question at issue lies in comparing the correlation of the rank order of the interviewers' scores and the rank order of their preferences for candidates' characteristics, i.e. the correlation between columns three and four of Table 22, which is 0.34, with the correlation of the rank order of the candidates' scores and the interviewers' preferences (i.e. between columns two and four), which is 0.48. If the former coefficient had been larger it would have seemed as though the interviewers were preferring candidates "in their own image". Since it is not, there is a suggestion that the interviewers were paying more attention to characteristics which differentiate the candidates from the general population of students; for example, the candidates are not only much less 'authoritarian' than the students generally (column 2), but the interviewers seemed to prefer the least 'authoritarian' from among them (column 4). In other words, the interviewers were tending to select candidates who epitomised the differences between the self-images of the candidates as a group, and those students generally.

However, there is a significant positive relationship between the interviewers' self-image and that of the candidates they accept for the Bartlett. These very tentative results should be interpreted with some caution; they are based on crude quantification, and uncertain knowledge of the comparability of responses to the personality test by candidates and interviewers in their very different circumstances.

Dynamic Personality Inventory and AH5

Fig. 3f shows the DPI profiles of the candidates high and low on AH5 T. There are no very striking differences between the profiles, nor any marked consistency of scores within the main groups of scales. The differences between the two groups of candidates are significant on three scales ($p < .05$): a high score on AH5 T is associated with greater 'impulsiveness' (OI), and less 'liking for seclusion' (Ws) and 'interest in children' (C). Only the third of these differences is paralleled to an appreciable extent in the profiles for candidates with high and low Academic Record (Fig. 3a).

Comparison of results of selection by interview and by paper qualifications with DPI scores

The two sets of relationships between DPI scores and paper qualifications, and between DPI scores and the offer of a place at the Bartlett, can be compared. Would the DPI self-image of the students who enter the Bartlett have been very different if they had been selected only on the basis of their paper qualifications? Table 23 and Figure 3d, e, compare the mean DPI profiles of (a) candidates who were accepted with those who were rejected in actual practice; and (b) of those who might have been accepted and rejected if their paper qualifications only had decided the case. (For the sake of the argument, it is taken that a candidate's paper qualifications would have secured him a place if he had at least two high grades out of the three.)

The differences between the accepted and rejected candidates in mean DPI scores are generally rather larger than those between the groups with high and low paper qualifications. On the Anal scales the two "accepted" groups are similar but there are differences on a number of the Phallic scales (Pn to Pi) and on the measures of masculinity and femininity. The group with high paper qualifications, compared with those actually accepted, have lower mean scores for 'femininity' (F) and 'oral aggression' (OA) and higher scores for 'liking for seclusion' (Ws), 'attention to details' (Ad), the five Phallic scales 'exhibitionism' (Pe), 'drive for achievement' active (Pa) and passive (Ph), 'sensitivity and imagination' (Pf) and 'interest in exploration and adventure' (Pi), and for 'masculinity' (M) and 'ego-defensive persistence' (EP). These differences are not listed as being statistically significant, but in order to suggest the general shape of the profiles of the two groups. (The significance of differences would be difficult to determine, because membership of the two groups overlaps and because the criteria of group inclusion are positively intercorrelated.)

The difference in scores for 'attention to details' (Ad), 'femininity' (F) and 'ego-defensive persistence' (EP), may be due to the interviewers' implicit preference for these characteristics (see Stringer and Tyson 1968). On the other hand, the different scores for the five Phallic scales seem to come from the consistent positive correlations between them and each of the paper qualifications, particularly CS. The differences on 'liking for seclusion' (Ws) and 'oral aggression' (OA) also reflect the relatively high correlation of these scales with CS.

TABLE 23. Mean DPI scores (sample stens) and differences between the means of candidates accepted and rejected, and of candidates with high and low paper qualifications.

DPI Scale	Offer of place			Paper qualifications		
	Accept	Reject	Acc. -Rej.	High-low	High	Low
H	4.46	4.72	-.26	.08	4.64	4.56
Wp	4.37	4.62	-.25	-.09	4.45	4.54
Ws	4.34	4.61	-.27	.33	4.66	4.33
O	4.63	4.30	.33	.21	4.57	4.36
OA	4.76	4.59	.17	-.26	4.53	4.79
Od	4.50	4.77	-.27	-.40	4.43	4.83
Om	4.65	4.42	.23	.32	4.70	4.38
Ov	4.56	4.60	-.04	.22	4.70	4.48
Oi	4.54	4.46	.08	.09	4.55	4.46
Ou	4.77	4.32	.45	.41	4.76	4.35
Ah	4.36	4.72	-.36	-.20	4.44	4.64
Ad	4.23	4.88	-.65+	-.14	4.50	4.64
Ac	4.01	4.96	-.95*	-.58+	4.19	4.77
Aa	4.44	4.76	-.32	-.07	4.57	4.64
As	4.01	4.82	-.81*	-.59+	4.12	4.71
Al	4.37	4.64	-.27	-.50+	4.24	4.74
P	4.46	4.58	-.12	-.14	4.44	4.58
Pn	4.52	4.44	.08	-.26	4.34	4.60
Pe	4.50	4.39	.11	.42	4.67	4.25
Pa	4.33	4.44	-.11	.24	4.52	4.28
Ph	4.20	4.28	-.08	.36	4.44	4.08
Pf	4.37	4.41	-.04	.25	4.53	4.28
Pl	4.40	4.52	-.12	.51+	4.74	4.23
S	4.59	4.18	.41	.23	4.50	4.27
TI	4.59	4.50	.09	-.04	4.52	4.56
CI	5.02	4.16	.86*	.64+	4.92	4.28
M	4.33	4.66	-.33	.17	4.60	4.43
F	4.89	4.17	.72*	-.09	4.46	4.55
MF	4.63	4.36	.27	.02	4.50	4.48
SA	4.57	4.61	-.04	.14	4.66	4.52
C	4.54	4.72	-.18	-.22	4.52	4.74
EP	4.40	4.85	-.45+	.01	4.64	4.63
EI	4.66	4.35	.31	.37	4.70	4.33

+ $p < .05$ * $p < .01$ by t test.

In summary, the method of selection used in 1964-66 had the result of selecting at interview a group of candidates who differed from those rejected in their performance on AH5 and DPI. It is perhaps to be expected that the interview would distinguish candidates according to personality, but it is interesting to note that grading on paper qualifications does also; the relevance of this finding is elaborated in the Discussion.

PERFORMANCE

10. PERFORMANCE IN BACHELOR'S DEGREE COURSE, COHORTS 1960-64

The Bachelor's Degree can be completed after a minimum of three years study, and the performance in it of students who entered the School between 1960 and 1964 has been studied. We do not report here on performance in the Master's Degree course firstly because no grading is returned in the final results, and secondly because the number of students who have completed it so far is small - 22 (representing 43 per cent of their cohorts). The reduction in numbers in the post-graduate course is due to the facts that admission to the Master's Course was restricted, with few exceptions, to students who had obtained at least a Lower Second in the Bachelor's Degree, and that some students elect to leave the School to get practical experience before entering the course.

The final results of the Bachelor's Degree examinations were returned as First Class, Upper Second, Lower Second, Third Class or Fail. These grades were awarded on the results of written papers and studio work. Papers were taken at the end of the first, second and third years, in History of Architecture, Theory of Structures and Structural Design, and Scientific Principles of Building; in addition, there was a paper on Aspects of Biological Science in Relation to Architecture in the first year and on Aspects of Social Science in Relation to Architecture in the second year. In studio work, the student was assessed on a series of design projects. The assessments were made (usually by more than one teacher, by several in the case of long and complex projects) as the projects were completed during the year, and checked at a final portfolio review at the end of the year by a board of teachers. (The new B.Sc. Degree Regulations, establishing a course unit system, were introduced for the 1966 entrants, but do not affect the students considered here.)

Students who failed one examination in the first or second years were permitted to repeat the examination in the following year; those who failed more than one, or failed in studio work, either repeated the year's work, or left the School.

We express performance in terms of pass rates of cohorts, not of classes. A 'cohort' is a group of students newly admitted to the School in any one year. Students who repeat a year in the School or leave for a year or more and return to it, join with members of another cohort to form a 'class'.

Degree results

Table 24 shows the performance in the Bachelor's Degree examination of students admitted to the School in 1960-64. Of the 112 students admitted, 79 students have succeeded in passing the degree examinations; 7 of them obtained

TABLE 24. Bachelor Degree results of cohorts 1960-64

Cohort	n	1st Class	2nd Class		3rd Class	Fall	Still Attempting	Left before 3rd Year
1960	13	0	3	3	4	1	0	2
1961	15	1	4	2	2	1	0	5
1962	23	2	4	6	2	2	2	7
1963	30	3	3	9	7	0	3	5
1964	31	1	9	7	7	1	3	4
Total	112	7	23	27	22	5	8	23

a First Class, 23 an Upper Second, 27 a Lower Second and 22 a Third Class. Eight students are still working for the Degree (either in or out of the School), having failed in first, second, or third years, and 25 have given up (23 before the third year and two following the third year). The success rate at present is therefore, 71 per cent of entrants, and the loss, 22 per cent. In cohort 1964 this has been reduced to 12 per cent. The national wastage rate, all subjects, for entrants in 1957 was 14 per cent (Robbins, 1963b). A more recent study shows that for students who normally would have graduated in 1965/66, in all subjects, after a period of study of three years, the percentage leaving without obtaining a degree was 12.1 per cent (University Grants Committee, 1968), but Architecture had the highest proportion of students leaving without a first degree, 25 per cent.

In order to take account of the differences between individuals in cost of getting a degree, whether to the Bartlett in facilities expended, or to the student in terms of anxiety and effort involved in repeating examinations, performance has been rated not only according to degree class obtained, but to relative success during the course.

Bartlett performance categories

Students in each cohort have been classified into five groups (which we shall call "Bartlett categories") according to their performance during the Bachelor's Degree Course:-

- (i) "OK". These have completed the First Degree in the minimum time of three years, without failing in any written examination during the course, and having been satisfactory in studio work.
- (ii) "Chequered". These have completed the degree in the minimum time, but have been referred in written papers, i.e. allowed to repeat the examination in the following year while continuing the course. They had been satisfactory in studio work (referral in studio work is not permitted).
- (iii) "Limping". These have completed the degree or are still attempting to do so, but in longer than the minimum time, because they have had to repeat a year, or re-take examinations after spending a year or more out of the School.
- (iv) "Lost". These have left the School without achieving a degree. With two exceptions (students who left the country for personal reasons after passing the First Year examination), these students have failed in examinations and/or studio work.
- (v) "Withdrew". Four students withdrew very early in their first session, in order to take another university course.

From Table 25 it will be seen that 39 per cent of the students in cohorts 1960-64 were "OK" and 21 per cent "chequered" (these two categories, together make 60 per cent who have completed the First Degree in minimum time); 18

TABLE 25. Classification by performance during Bachelor's Degree Course at July 1967. Cohorts 1966-64.

Cohort	Entered n	Entered %	Withdrawn n	Withdrawn %	Lost n	Lost %	Limping n	Limping %	Chequered n	Chequered %	O.K. n	O.K. %
1960	13		0		3	23	3	23	1	8	6	46
1961	15		0		6	40	2	13	2	13	5	33
1962	23		2		5	22	3 (2)	13	2	8	11	48
1963	30		1		4	13	9 (3)	30	7	23	9	30
1964	31		1		3	10	3 (3)	10	11	36	13	42
Total	112	100	4	3	21+	19+	20-	18-	23	21	44	39

Withdraw = withdrew before taking first year examinations
Lost = left school after taking first year examinations
Limping = completed degree in more than minimum time, because of failures
Chequered = completed degree in minimum time with failures
O.K. = completed degree in minimum time, without any failures.
() = still not completed degree
+ or -, figures not yet definitive, will increase (+) or decrease (-).

per cent are "limping", completing the degree in longer than minimum time (the fate of eight of these is not yet settled); 19 per cent are "lost", having left the School without achieving a degree; and 3 per cent withdrew before taking the first year examinations. It will be noted from Table 25 that the percentage lost after taking first year examinations decreased after 1961, and was only 10 per cent in Cohort 1964.

**TABLE 26. Performance by "student years" spent at the Bartlett at July 1967.
Cohorts 1960-64.**

	No. of students	Years at Bartlett	Years out	"student years"
Passed Degree	67	3	0	201
	5	3	1	15
	6	4	0	24
	1	4	1	4
Attempting Degree	2	3	1	6
	3	3	2	9
	1	3	3	3
	1	4	0	4
	1	4	2	4
Left without Degree				
early in 1st year	4			4
after 1 year	12			12
after 2 years	7			14
after 3 years	0			0
after 4 years	2			8
Total	112			308

In assessing success rates we should look at the cost of losses in terms of School places occupied (Table 26). 67 students (60 per cent of entrants) obtained a degree with the maximum of economy within three years of entry. A further five students had spent only three years at the Bartlett, but had taken longer to qualify because they had had to repeat examinations. Seven passed the degree after spending continuously or intermittently, four years at the Bartlett. On the loss side, four students who left within the first few weeks did not cost

much in terms of Bartlett expenditure, though they had occupied places on entry which could have been more productively filled. The remaining 21 losses cost between them a total of 34 "student year" places (having spent one, two, three or four years at the Bartlett). The Robbins Committee estimated an average total cost per university student of £777 per year in 1962/63. (Robbins 1963c).

One aim of selection and teaching should be to try to increase the proportion of students who complete their degree in minimum time, even if they fail occasionally. An analysis of reasons for failure may give clues to improve selection procedures. Of the 45 students who failed to complete the degree in minimum time (the "withdrawals", "lost", and "limping" students are taken together here), in 21 cases in the Tutor's opinion the main factor was academic weakness. In an almost equal number of cases however the strongest factor in failure was not this, though some of these students were in fact also weak. Of these 24 students, 11 were known to have problems of 'adjustment', one was absent through illness in the Third Year and returned to repeat the year, and 12 withdrew from the course for personal reasons. Of the latter 12, four withdrew within a few weeks of starting the course, and two overseas students, after passing the first examination, wished to return to their own country. Four left after failing in examinations, and it was thought that personal factors may have influenced their performance (i.e. one was ill, one wanted to change his profession, and two women got married); and two voluntarily left the School for a year (one of these has now passed his Degree and the other may return to complete her examinations).

Readmission after failure ("limping" students)

The policy of permitting students to return to the School after failure, needs reconsideration when there is considerable pressure for places in the School, and when a student who has demonstrated weakness takes the place of a promising (or at least untried) newcomer. Since 1960, 23 students have been allowed to repeat a year, or retake their examinations after a year or more away from the School. Eight students (two from the 1962, and three from the 1963 and 1964 cohorts) are still "limping": four in the School, and four outside still have to retake their examinations. Of the 15 students who have already taken the Bachelors Degree examinations (eight of them after repeating a year in School) none gained a First or Upper Second Degree; three gained a Lower Second, nine a Third Class, and three failed (see Table 28c). Of the three students who gained a Lower Second Class Degree, one had left for personal reasons, not because of failure.

Relation between written examinations and studio work

It is sometimes suggested that some architects might be good at design but be unable to pass written examinations. We find however, that performance in studio work and in written examinations in the Third Year are related. Table 27 shows that no student achieving a first in studio work in the Third Year obtained a mean mark in written examinations of less than 50 per cent, and no student failing studio work obtained a mean mark in examinations above 49 per cent. The relationship is significant at $p < .05$. A more detailed study of performance during the first year supports this finding (see p.112).

TABLE 27. Relation of mean mark on written examinations to studio work grade in Third Year. Cohorts 1960-64.

Exam mean mark	Studio work grade					Total
	1	2 ¹	2 ²	3	F	
70-100	2	3	2	0	0	7
60-69	6	9	12	4	0	31
55-59	2	0	3	10	0	15
50-54	2	2	4	3	0	11
40-49	0	2	0	4	3	9
0-39	0	0	0	2	1	3
Total	12	16	21	23	4	76*

* Results are given of students who completed the course in the minimum time.

$X^2 = 5.02$ df 1 $p < .05$ Yates correction applied.

55-100 : 0-54

1-2² : 3-F

11. RELATION BETWEEN PERFORMANCE IN BACHELOR'S DEGREE COURSE AND SELECTION AND OTHER CRITERIA, COHORTS 1960-64

For estimating academic success rates it was felt that the four students who transferred to another university course, and the two overseas students in the group classified "lost" who left the country without having failed academically, should reasonably be excluded from calculations. The following discussion is therefore based on the performance of 106 of the 112 students in cohorts 1960-64.

G.C.E. examinations and performance

(1) Academic Record on application (AR App.)

The assessments made of Academic Record at the time of application i.e. before A-level results taken in June of that year were available, have been compared with students' performance in the Bartlett. Table 28a shows that 20 out of 30 of the A's were in the "OK" performance category while only 7 out of 34 of the C's were in this group. All the D's and E's were lost. The relationship is significant at $p < .001$.

TABLE 28. Relation between Academic Record and Bartlett performance.
Cohorts 1960-64

a. Academic Record on application and Bartlett performance category.

Performance categories	Academic Record (App.)					Total
	A	B	C	D	E	
OK	20 (17)	17 (14)	7 (6)	0	0	44 (37)
Chequered	5 (4)	8 (7)	10 (8)	0	0	23 (19)
Limping	4 (4)	9 (6)	7 (4)	0	0	20 (14)
Lost	1 (1)	4 (3)	10 (7)	3 (2)	1	19 (13)
Total	30 (26)	38 (30)	34 (25)	3 (2)	1 (0)	106 (83)

$$X^2 = 20.36 \quad df \ 3 \quad p < .001$$

$$A + B : C + D + E$$

$$OK : Ch : Limp. : Lost$$

NOTE: figures in brackets are for the 83 students for whom grades on academic record, referee's report, candidate's statement and interview are available. Reference is made to these on p. 85.

$$X^2 = 10.26 \quad df \ 4 \quad p < .05$$

$$A : B : C + D + E$$

$$OK : Ch : Limp + Lost$$

(The small number of students with grades D and E in Table 28, a to e, were admitted before 1963, when the practice of using Academic Record as a criterion of selection had not been adopted.)

(ii) Academic record at entry (AR Ent.)

A global assessment (AR Ent.) of each student's Academic Record on entry to the Bartlett has been made in the same way as that made in screening for interview (AR App.) (see p. 17), but taking into account the A-level results which were now available. (The value of the assessment made on O-levels only, for predicting

likelihood of passing A-levels, is discussed on page 32).

Table 28b shows the distribution of students among Bartlett performance categories and the AR Ent. grades. It will be

TABLE 28. Relation between Academic Record and Bartlett performance.
Cohorts 1960-64

b. Academic Record on entry and performance category

Performance categories	Academic Record (Ent.)					Total
	A	B	C	D	E	
OK	15	19	10	0	0	44
Chequered	3	9	11	0	0	23
Limping	0	6	13	1	0	20
Lost	0	4	12	2	1	19
Total	18	38	46	3	1	106

$$X^2 = 23.18 \quad df \ 3 \quad p < .001$$

$$A + B : C+D+E$$

$$OK : Ch : Limp : Lost$$

noted that the relationship of the two criteria of performance is marked, and by the X^2 test is significant at $p < .001$. All of the 18 students graded A on AR Ent. gained the degree in the minimum time; only three of them failed an examination, whereas over three-quarters (36 out of the 46) of those with C grade did so, and all of those with D or E "limped" or were "lost". A quarter of the C's were lost, one-ninth of the B's and none of the A's.

In Table 28c AR Ent. is compared with class of degree obtained by those students who took it in the minimum time. It will be seen that the majority of the A's (13 out of 18) have obtained a First or Upper Second degree, four obtained a Lower Second and one a Third. No C's gained a First and only three a 2.1. The relationship of class of degree with AR Ent. is significant at $p < .001$.

Performance in the third year written examinations, and in studio work, have also been considered separately in relation to Academic Record. 41 out of 49 students graded A or B on AR Ent. had a mean mark of 55 or above in the third year written examinations, while only 12 out of 27 of those graded C or D gained a mean mark of 55 or above (Table 28d). The relationship is significant at $p < .01$.

TABLE 28. Relation between Academic Record and Performance. Cohorts 1960-64.

c. Academic Record on entry and Bachelor's Degree results:
In minimum time.

Degree	Academic Record (Ent.)					Total
	A	B	C	D	E	
1	3	4	0	0	0	7
2.1	10	10	3	0	0	23
2.2	4	10	10	0	0	24
3	1	4	8	0	0	13
Fail	0	3	5	1	0	9
Total	18	31	26	1	0	76*

In more than minimum time ("limpers")

1	0	0	0	0	0	0
2.1	0	0	0	0	0	0
2.2	0	1	2	0	0	3
3	0	2	6	1	0	9
F*	0	0	2	1	0	3
Total	0	3	10	2	0	15*

* Results are given for the 76 students who took the degree in minimum time; and of the 15 limpers in the table below, the 9 who failed entered the limping or lost categories.

In minimum time:

$X^2 = 12.46$ df 1 $p < .001$. Yates correction applied.

A + B : C+D+E

1 + 2.1 : 2.2 + 3 + Fail.

TABLE 28. Relation between Academic Record on entry and Bartlett performance. Cohorts 1960-64.

d. Academic Record on entry and Mean mark in written examinations in Third Year.

Exam mean mark	Academic Record (Ent.)					Total
	A	B	C	D	E	
70-100	3	4	0	0	0	7
60-69	11	14	6	0	0	31
55-59	3	6	6	0	0	15
50-54	1	4	5	0	0	11
40-49	0	0	8	1	0	9
0-39	0	4	0	0	0	3
Total	18	31	26	1	0	76*

Limpers and Lost before 3rd Year	0	7	20	2	1	30*
Grand Total	18	38	46	3	1	106

* Results are given for the 76 students who took the degree in minimum time; and of the 30 "limpers" and students "lost" before third year.

$X^2 = 10.78$ df 1 $p < .01$ Yates correction applied.

A + B : C + D
55-100 : 0-54

In third year studio work (Table 28e), it will be seen that 11 out of 18 students graded 'A' on their Academic Record gained Firsts or Upper Seconds whereas only 5 out of the 26 'C's did so. A sixth of the 'A's, a third of the 'B's and a half of the 'C's got a Third, or failed studio work. The relationship is significant at $p < .02$. (The relationship between mean mark in examinations, and grade in studio work, has been referred to on page 66.)

This positive relation of AR Ent. with performance in the degree course is supported by the study of the first year performance of the 1964-66 cohorts (see p.116).

(iii) UCCA classification of A-levels

We have also compared Bartlett performance with the UCCA grading on A-levels (see p. 32). Those with "good" A-levels performed better in the course than those with lower grades. The relationship is significant at $p < .001$ (Table 29a). (See also p.116).

(iv) Petch classification of A-levels

The classification by Petch of grades obtained at A-level in 1956 (Petch, 1961) has been adopted for a comparison with Bartlett performance. Table 29b shows the distribution of Petch grades among the Bartlett performance categories. It will be seen that of the 42 graded one, two or three, 31 are in the "OK" performance category, six "chequered" and five "limping" or "lost", while of those graded four, five or six, 33 out of 61 are in the "limping" or "lost" performance categories. The relationship is significant at $p < .001$.

(v) Number of A-levels

The proportion of students in the total group with only two A-levels was approximately one in five. They did less well at the Bartlett, than those with more passes. Of 43 students who have passed all their examinations, only three (i.e. one in fourteen) had two A-levels, while of the 62 who failed an examination a third had only two A-levels, and of the 19 "lost" students a half had only two A-levels (Table 29c). The relationship is significant at $p < .02$.

TABLE 28. Relation between Academic Record on entry and Bartlett performance. Cohorts 1960-64.

e. Academic Record on entry and Class in studio work in Third Year.

Studio Third Year	Academic Record (Ent.)					Total
	A	B	C	D	E	
1	6	4	2	0	0	12
2 ¹	5	8	3	0	0	16
2 ²	4	10	7	0	0	21
3	3	8	12	0	0	23
F	0	1	2	1	0	4
Total	18	31	26	1	0	76*

Limpers and Lost before 3rd Year	0	7	20	2	1	30*
Grand Total	18	38	46	3	1	106

* Results are given for the 76 students who took the degree in minimum time; and of the 30 "limpers" and students "lost" before third year.

$X^2 = 6.02$ df 1 $p < .02$ Yates correction applied.

A + B : C + D

1 + 2² : 3 + F.

TABLE 29. Relation between A-level performance and category of Bartlett performance. Cohorts 1960-64.

a. UCCA grade.

Performance category	UCCA Grade		Total
	Good	Not Good	
OK	30	13	43
Chequered	5	17	22
Limping	4	15	19
Lost	2	17	19
Total	41	62	103*

* 3 not assessable.

Note: The classification of A-levels is described in UCCA. 1965. Second Report 1963-64, and referred to on p.32.

$$X^2 = 15.04 \text{ df } 2 \text{ } p < .001$$

OK + Ch : Limp : Lost
Good : Not Good

(vi) A-level Physics

Since the relevance of Physics to some aspects of work at the Bartlett, and especially to Structures, and to Scientific Principles of Building, is obvious, the relation of performance in A-level Physics to performance in these examinations has been studied. There is an examination in each of these subjects in each of the three years. Students in cohorts 1960-64 who passed all the examinations, and those who failed in one or more of them, were compared. The numbers of students in each group who had not taken A-level Physics, and the mean mark in Physics of those who had taken it, are shown in Table 30.

TABLE 29. Relation between A-level performance and category of performance at Bartlett. Cohorts 1960-64.

b. Petch classification

Performance categories	NA	Petch Categories						Total
		1	2	3	4	5	6	
OK	1	2	10	19	9	3	0	44
Chequered	1	1	1	4	7	7	2	23
Limping	1	1	0	3	8	6	1	20
Lost	0	0	0	1	9	8	1	19
Total	3	4	11	27	33	24	4	106

NA = Results for 3 students not classified.

$\chi^2 = 17.26$ df 1 $p < .001$. Yates correction applied.

1 + 2 + 3 : 4 + 5 + 6

OK + Ch : Limp. + Lost

Summary of Petch categories. See Petch, 1961, for full description.

- Cat. 1. Grades of 70, 60, 60 in three advanced subjects, and 60 and 50 in two Scholarship papers.
- Cat. 2. Grades of 60 in three Advanced Subjects and 50 and 45 in two Scholarship papers.
- Cat. 3. Grades of at least 60 in one Advanced Subject and, for example, 55 and 50 in the other two. Category 3 can also be achieved on a performance in only two Advanced Subjects.
- Cat. 4. Pass in three or more Advanced level subjects but at a lower standard than that required for category 3.
- Cat. 5. Pass in two Advanced-level subjects at a standard lower than that required for category 3.
- Cat. 6. Those who did not qualify for any categories 1 to 5.

TABLE 29. Relation between A-level performance and category of performance at Bartlett. Cohorts 1960-64.

c. Number of A-levels

Performance Category	n	Number of A-levels			
		5+	4	3	2
OK	43	0	12	28	3
Chequered	23	0	5	12	6
Limping	20	1	3	12	4
Lost	19	0	0	9	10
Total	105*	1	20	61	23

* 1 student did not take A-levels (exempt through foreign degree).

$X^2 = 5.95$ df 1 $p < .02$. Yates correction applied.

3+ : 2

OK + Ch : Limp + Lost

TABLE 30. Relation between A-level Physics and performance in Structures and Scientific Principles of Building examinations. Cohorts 1960-64.

Structures and Sc. P. Building examinations	n	Without Physics n	Physics	
			n	mean %
Passed all	46	10	36	58
Failed one or more	53	19	34	48
Total	99*	29	70	53

* 7 students not included.

$X^2 = 1.77$ df 1 NS

Without Physics : With Physics

Passed all exams : Failed one or more.

It will be noted that nearly a third of the students had not taken A-level Physics; and that a greater proportion of these (19 out of 29, 66 per cent) than of those who had taken Physics (34 out of 70, 49 per cent) failed in Structures or Scientific Principles of Building, although this relationship is not significant. Among those who had taken Physics, the mean mark in this examination of those who passed all Structures and Scientific Principles of Building examinations was slightly higher (10 per cent) than that of those who had failed one or more of the examinations.

However, before concluding that a pass in A-level Physics is in itself of some advantage in these courses, we must consider the possibility that general academic ability is a confounding variable. The group of students who took Physics included a slightly greater proportion with high AR Ent. grades, compared with those who did not take Physics, though the relationship is not significant. The evidence of the value of A-level Physics is therefore equivocal.

(vii) A-level Art

Table 31a shows the distribution within the Bartlett categories of students who have taken Art in GCE examinations. One-quarter of the students have not taken Art at either O-level or A-level, nearly one-quarter have taken it at O-level only, and a half have taken it at A-level, with or without O-level also. There is no relationship of GCE Art to the performance categories. Among those who had taken Art at A-level, the mean mark in Art of the best Bartlett performers (63 per cent) is slightly higher than that of the worst (55 per cent), but as with Physics, this may be due to better general academic ability.

It might be that ability in Art is more closely related to studio work than to general performance. Table 31b shows the distribution of students who have taken A-level Art among the categories made according to performance in studio work. The proportion of satisfactory students among those with A-level Art is slightly higher than among those without it but the differences are not significant. Of the 48 students without Art, a half failed in studio work, or were weak enough to be warned; and of the 57 with Art, a third failed or were very weak. The mean mark obtained in A-level Art by the 13 who failed or were weak in studio work is slightly lower than that obtained by the 37 who were satisfactory, but as with Physics this difference may be due to differences of more general ability.

TABLE 31. Relation between GCE Art and Bartlett performance.
Cohorts 1960-64.

a. Students not taking GCE Art, taking O-level Art only,
 A-level Art ($\pm$ O-level).

Performance Categories	n	No Art n	O-level only n	A-level ($\pm$ O-level) n	A-level mean mark %
OK	43	8	10+(1F)	23+(1F)	63
Chequered	23	7	3	13	56
Limping	20	6	4	8+(2F)	52
Lost	19	5	4	8+(2F)	55
Total	105*	26	21+(1F)	52+(5F)	58

* 1 student is not included who did not take GCE O- and A-levels.

(F) = Failure.

TABLE 31. Relation between GCE Art and Bartlett performance.
Cohorts 1960-64.

b. A-level Art and studio grade.

Studio Grade	n	A-level Art		
		Without n	With n	Art mean mark %
Class 1,2,3	61	24	37	61
Warned/Weak**	20	13	7	40
Failed	24	11	13	53
Total	105*	48	57	57

* 1 student who did not take GCE A-levels is not included.

** at any end of year portfolio assessment (students who have repeated a year are also included in this category).

$$X^2 = 1.81 \text{ df } 1 \text{ NS}$$

Without Art : With Art

Class 1,2,3 : Warned/Fail.

TABLE 32. Relation of Referee's Report to Bartlett performance categories. Cohorts 1960-64.

Performance Categories	NA	Referee's Report grade			Total
		A	B	C	
OK	1	17 (15)	23 (19)	3 (3)	44 (37)
Chequered	3	6 (6)	11 (10)	3 (3)	23 (19)
Limping	2	5 (5)	10 (7)	3 (2)	20 (14)
Lost	1	1 (1)	13 (9)	4 (3)	19 (13)
Total	7	29 (27)	57 (45)	13 (11)	106 (83)

No students were graded D or E amongst those who entered the School.

NA = Referee's report not available.

$\chi^2 = 3.37$ df 1 $p < .10$. Yates correction applied.

A : B+C
OK + Ch : Limp + Lost

Note: figures in brackets are for the 83 students for whom grades on academic record, referee's report, candidate's statement and interview are available. Reference is made to these on p. 85.

$\chi^2 = 2.37$ df 2 $p > .30$ NS

A : B+C
OK : Ch : Limp + Lost

Referee's Report and performance

As assessment was made of the warmth of recommendation by the Headmaster or other Referee (see p.17). Table 32 shows that these grades are related to Bartlett performance categories; the relationship is on the borderline of significance ($.1 > p > .05$). It will be seen that only one-fifth of the 'A's (6 out of 29), while nearly a half of the 'B's and 'C's limped or were lost (30 out of 70).

Candidate's Statement and performance

The Candidate's Statement was also graded on a five-point scale (see p. 19). There is a relationship between this and performance at the Bartlett, significant at $p < .01$ (Table 33). Only one-fifth of those graded 'A', but four-fifths of the 'C's limped or were lost.

Of the three paper qualifications, Candidate's Statement was found to be the best predictor of first year performance (see p. 116).

Interview and performance

(i) Interview grades

Entrants in 1960 were not graded at interview. In 1961, 1962 and 1963 candidates were interviewed by a board (see p.19ff); the procedure used in 1964 is described on pp. 23-24. Grades A, B+, B (and B- in 1964) and C were given. All A's were offered places and all C's rejected; some B's were offered places, some placed on the reserve list, and a few rejected.

Table 34a shows the relationship of interview grade to Bartlett performance category. There are no marked differences between the performance of those A, B+ or B, but those placed on the reserve list did less well; 8 out of 11 of them are in the "limping" or "lost" categories, while only 16 of the 56 graded A or B+ "limped" or were "lost". Comparing A, B+, B with B-, RL (rather than A, B+ with B, B-, RL) shows a significant relationship. However, the interview grade is correlated with Academic Record on entry (Table 34b) $p < .01$. Nine of the "reserve list" students had C or lower Academic Record, whereas less than half of the A or B+ students had low Academic Record Grades. As will be seen later, (p. 116), in the study of the first year performance of the 1964-66 cohorts, the interview was of little predictive value, and in particular, no consistent relationship was found between performance in studio work and the ratings given at the interview specifically intended to test "ability to organize material concretely".

TABLE 33. Relation of Candidate's Statement to Bartlett performance categories. Cohorts 1960-64.

Performance Categories	Candidate's Statement			Total
	A	B	C	
OK	21 (15)	21 (20)	2 (2)	44 (37)
Chequered	14 (12)	7 (7)	1 (0)	22 (19)
Limping	3 (3)	11 (7)	6 (4)	20 (14)
Lost	5 (4)	8 (5)	6 (4)	19 (13)
Total	43 (34)	47 (39)	15 (10)	105* (83)

No students were graded D or E.

* Statement for 1 student not available.

$$X^2 = 12.76 \text{ df } 3 \text{ } p < .01$$

A : B + C

OK : Ch : Limp : Lost

NOTE: Figures in brackets are for the 83 students for whom grades on academic record, referee's report, candidate's statement and interview are available. Reference is made to these on p. 85.

$$X^2 = 6.40 \text{ df } 2 \text{ } p < .05$$

A : B + C

OK : Ch:Limp + Lost

TABLE 34. Relation of interview grade to Academic Record (Ent) and Bartlett performance categories. Cohorts 1961-64.

a. Bartlett performance categories

Performance Category	Interview grade					Total
	A	B+	B	B-	R	
OK	15	14	6	0	2	37
Chequered	3	8	5	2	1	19
Limping	7	3	1	0	3	14
Lost	3	3	1	1	5	13
Total	28	28	13	3	11	83

NOTE: Interview grade was not recorded for the 1960 cohort. Figures are given for the 83 students in the 1961-64 cohorts for whom grades on academic record, referee's report, candidate's statement and interview are available.

$X^2 = 6.51$ df 4 $p < .20$ NS

A : B+ : B : B- + RL

OK : Ch : Limp + Lost

$X^2 = 6.24$ df 1 $p < .02$. Yates correction applied.

A + B+ + B : B- + RL

OK + Ch : Limp + Lost

(ii) The validity of statements made at a board interview

In order to find out whether the impressions that an interviewer got of a candidate's particular personality characteristics or skills were valid, i.e. whether a person "looked" the same at selection interview as he did later as a student, we have asked teachers to match the statements that were made at interview with the students they subsequently came to know. The interviews had been conducted in a conventional manner by a board of three teachers in 1962 and four in 1963. Particularly "interesting" or seemingly specific and significant statements, each referring to one student, were selected from our records of the statements made at selection interview. Teachers who were familiar with the students concerned were given a list of the statements and a list of their classmates who had been interviewed at the same time. The instructions were:

TABLE 34. Relation of interview grade to Academic Record (Ent) and Bartlett performance category. Cohorts 1961-64.

b. Academic Record on entry

Academic record Ent.	Interview grade					Total
	A	B+	B	B-	RL	
A	7	4	2	0	1	14
B	13	11	6	0	1	31
C	8	13	5	3	8	37
D	0	0	0	0	1	1
E	0	0	0	0	0	0
Total	28	28	13	3	11	83

$$X^2 = 3.72 \text{ df } 1 \text{ } p < .10$$

$$A + B^+ : B + B^- + RL$$

$$A + B : C + D + E$$

$$X^2 = 0.01 \text{ df } 1 \text{ } p < .01$$

$$A + B^+ + B : B^- + RL$$

$$A + B : C + D + E$$

See footnote to Table 34a.

Each of the following numbered statements was made about one of the students on the appended list, when they were interviewed at selection.

Would you please consider which student, if any, each statement could apply to, and tick opposite his name in the appropriate column? If you think any statement could not be applied to a student, please put an X in the appropriate column.

This was done for two cohorts, 1962 and 1963, each by three teachers. For the 1962 cohort there were remarks about six students in a class of 15, 15 and 12 in successive years (a number drop out), and for the 1963 cohort, remarks about 10 students in successive classes of 22, 20 and 16. One of the teachers had been present at the selection interviews for both cohorts, another at those for the 1962 cohort.

The results are illustrated by reference to Assessor A's judgments about members of cohort 1963. He had interviewed all the candidates, and had made eight of the selected ten statements. He assigned three statements correctly, and seven incorrectly (i. e. said that they could not be applied to the students about whom they had been made at interview). These figures must be interpreted in the light of the total number of positive ("could apply") and negative ("could not apply") statements made by this assessor. He gave 56 positives out of a total of 220 judgments, which gives an expected frequency of .25 compared with his actual frequency of .3 (three correct in the selected ten students). His expected frequency of negative statements was .75, and his actual frequency .7 (he said that seven of the ten students could not be described by the statement made about them at interview). The five other sets of teachers' judgments were also roughly the same as might be expected by chance. The mean frequency of correct attribution was .11, the expected frequency being .22, and the mean frequency of statements incorrectly said to be not applicable was .52, compared with an expected frequency of .48.

A total of six correct attributions was made. In no case did all three assessors agree in allocating a statement to the right student but there were two cases in which two did so; in one of these the third assessor said the statement could not apply; in the other he was neutral. In the two cases in which only one assessor correctly attributed a statement, a second assessor said it would not apply to the student concerned, and the third made no judgment.

A more detailed analysis of some of the statements raises some interesting points. The following four laudatory statements were made about students who failed in at least one year, and were, as might be expected, voted "not applicable" by all assessors: "One of the most promising we've seen this year; shows great potential": "A much better candidate than would appear from his record; he has read about proportion in architecture, and shows real interest in the subject; he answers the questions thoughtfully": "One of the best we've seen; intellectually very keen; very well read; I'm surprised he wasn't accepted at one of the Cambridge colleges": "Quite efficient and forceful; a very good grip on the things that matter; interested in social requirements".

A very specific statement "His drawings are first-rate, mathematical, architectural, and imaginative" was correctly assigned to the appropriate student by two assessors, and the third made no judgment about him. But in the other cohort, a similarly specific attribute of a candidate had been commented on by two interviewers, "Excellent draughtsman" - "Brilliant draughtsman". One assessor said this could not be attributed to the student concerned, and the two others were neutral. Two assessors agreed in another case, in correctly assigning the statement "He appears naive, but I think he has great potential", but the third said that this could not be applied to the student concerned.

From this we conclude that there is little relationship between the statements made at a board interview about specific characteristics of candidates, and the opinion of teachers who become familiar with their work as students over three or four years.

Relative predictive value for performance at the Bartlett of Academic Record at application, Referee's Report, Candidate's Statement and interview.

The relative predictive values of Academic Record at application, Referee's Report, Candidate's Statement, and interview for students who entered the School are shown in Table 35. The values of X^2 shown in column I are for the 1960-64 cohorts (Tables 28a, 32, 33). We have no interview grades for the 1960 cohort (13) and in the 1961-64 cohorts information on all four of the criteria is not available for 10 students; these 23 students have been omitted in column II.

It will be seen from column I that the best single predictor is Academic Record followed by Candidate's Statement. The range of grades is reduced with the omission of the 1960 cohort (column II), and this in turn reduces the value of X^2 . Column II shows that the predictive value of Academic Record and Candidate's Statement is similar $p < .05$. Referee's Report is not significant. Regarding the interview, Table 34 shows that those graded B- or placed on the waiting list do less well than those graded high, and comparing A B+ B with B- RL (rather than A B+ with B B- RL) gives a significant result $p < .02$. In combining interview with Academic Record, Referee's Report and Candidate's Statement we have used the former cut off point. The combination of any one of the others with Academic Record raises the predictive value, the best combination being Academic Record with Candidate's Statement. The combination of three or four does not improve on this. This is similar to the correlations with First Year performance. (see p.120 Table 47). The numbers here are small (and in the single predictors do not allow us to use the same degrees of freedom). As pointed out on p. 99 we need to look further at performance and interview grade.

12. CANDIDATES WHO DID NOT ENTER THE BARTLETT IN 1963 AND 1964.

In 1963 the staff at the Bartlett were uneasy about our proposal to select for interview with Academic Record as the principal criterion. They did not feel that success in O-level GCE at secondary school necessarily predicted success in architecture school, and they were afraid we would miss some potentially very good architecture students, particularly amongst those graded 'C' on Academic Record. The same might apply to applicants not taking A-level Mathematics who, by our entrance requirements, did not qualify for entry to the Bartlett. For ethical reasons we were not able to apply the crucial test of admitting some candidates who would have been rejected by our criteria along with those we selected, and comparing the progress of the two groups through the school. But with the cooperation of the candidates, and of teachers at other schools of architecture, we were able to make some study of the subsequent performance of some of the candidates who applied to the Bartlett but did not enter it.

TABLE 35. Relative Prediction of Selection Criteria.

Predictors used in Selection			Correlation with Overall Performance		Cells used for χ^2	
AR (App.)	RR	CS Int	Table Ref.	I N = 106. 1960-64.	II N = 83. 1961-64.	
X			28a	20.36 df 3 p<.001	10.26 df 4 p<.05	A : B : CDE OK : Ch : Limp/Lost
	X		32+	3.37 df 1 p<.10 NS	2.37 df 2 p<.30	A : BC OK : Ch : Limp/Lost
		X	33*	12.76 df 3 p<.01	6.40 df 2 p<.05	A : BC OK : Ch : Limp/Lost
		X	34a		6.51 df 4 p<.20 NS	A : B+ : B- RL OK : Ch : Limp/Lost
		X	34a		6.24 df 1 p<.02	A B+ B : B- RL OK : Ch : Limp/Lost
X	X				10.38 df 3 p<.02	No C's : With C's OK : Ch : Limp : Lost
X		X			21.79 df 3 p<.001	No C's : With C's OK : Ch : Limp : Lost
X		X			13.98 df 3 p<.01	No C's : With C's or low interview (B-RL)
X	X	X			17.96 df 3 p<.001	No C's : With C's OK : Ch : Limp : Lost
X	X	X			13.05 df 3 p<.01	No C's : With C's or low interview (B-RL)
X		X			18.42 df 3 p<.001	No C's : With C's or low interview (B-RL)
X	X	X			17.90 df 3 p<.001	No C's : With C's or low interview (B-RL)

+ 7 Referee's Reports not available for 1960-64 cohorts.

* 1 Candidate's Statement not available for 1960-64 cohorts.

In considering the results it should be borne in mind that the numbers of students are small, and they were scattered among some 26 schools having different selection policies, sizes of class, curricula and standards of assessment. We have used two criteria of assessment of performance at architectural school, position in class (in quartiles) and whether RIBA exemption was achieved in the minimum time or not. Neither of these permits us to make direct comparisons with the performance at the Bartlett school of the students selected for entrance to it. The former criterion cannot be used for comparison because the whole of our intake was necessarily distributed between the four quartiles of its class. The second has limited validity for comparison, because the extent to which students are permitted or encouraged to leave for a year or more if they are having difficulties with the course varies among the schools. In any case, any comparisons of performance at different schools confounds differences of selection with differences of teaching and examining. This naturalistic follow-up of candidates who went elsewhere is obviously no substitute for the controlled experiment which permits comparison of the performance of selected and rejected subjects within the same academic environment.

The first part of this chapter reports what happened to candidates who applied in 1963, whether interviewed by us or not; how successful they were in getting into other schools of architecture, how they did in A-level examinations, and how our decisions at selection compare with those of other schools. Some data are also given for the candidates who were interviewed in 1964; we did not follow up those not interviewed in that year. The second part reports on how candidates admitted to other schools performed in their courses; this gives data for the 1963 candidates and the 1964 interviewees. The third part reports in greater detail on candidates who did especially well at other schools of architecture.

Reply to questionnaire

All candidates resident in Great Britain who had applied to us for admission in 1963 and those who were interviewed by us in 1964 were asked by postal questionnaire in October of the year concerned if they (1) had a place in an architecture school; (2) were continuing to apply to architecture schools; (3) had taken up another career. The number in each of these categories is shown in Table 36a for the 1963 candidates. 298 candidates were written to and 272 replied (91 per cent). The number applying through UCCA for first degree courses in architecture in 1963 was 623 (UCCA 1964); our sample is therefore 44 per cent of all architecture candidates applying through UCCA. Of the candidates who replied, 62 per cent were admitted to architecture school (35 per cent to university school and 27 per cent to non-university school), 23 per cent were continuing to apply, and 15 per cent had taken up another career. In the smaller 1964 group of interviewees, (Table 36b) of the 66 (out of 72 men interviewed) candidates who replied to our questionnaire, the success rate as we would hope was higher; 76 per cent entered a school, 59 per cent university and 17 per cent non-university. 28 per cent of the 1963 male candidates and 14 per cent of the 1964 interviewees, would not have been eligible for a place in any school as they had not reached the universally required standard in GCE examinations, i.e. a minimum of five passes of which two were at A-level.

TABLE 36a. Candidates applying to Bartlett School for entry in October 1963 (men and women, Great Britain): admission to school; continuing to apply; entered another career, and percentage "Good", "Pass", and "Fail" on UCCA A-level grade.

Candidates applying to Bartlett.	Admission			UCCA Grade					
	Men n	Women n	Total n	Men			Women		
				"Good" %	"Pass" %	"Fail" %	"Good" %	"Pass" %	"Fail" %
Admitted									
Bartlett	21	6	27	45	55	0	50	50	0
Other U.	54	14	68	45	55	0	46	54	0
NU.	66	7	73	14	86	0	14	86	0
Total	141	27	168	30	70	0	38	62	0
Continuing to apply	61	3	64	9	26	65	0	100	0
Entering another career	32	8	40	7	25	68	38	50	12
Total replying	234	38	272	22	52	26	36	61	3
No reply	22	4	26	0	43	57	0	25	75
TOTAL	256	42	298	20	52	28	33	57	10

U. = University

NU. = Non-university school

UCCA Grade as classified in UCCA. 1965. Second Report 1963-4. London: UCCA.

"Good" = A-level performance equivalent to three C grades and above, or AB in two.

"Pass" = 2 or more A-levels obtained at less than "Good" standard.

"Fail" = failed to obtain two GCE passes.

% of those classified in each case.

18 candidates out of 272 were not classified.

TABLE 36b. Candidates interviewed by the Bartlett School for entry in October 1964 (men, Great Britain): admission to school; continuing to apply; entered another career, and percentage "Good", "Pass" and "Fail" on UCCA A-level grade.

Candidates interviewed by the Bartlett.	Admission		UCCA Grade		
	Men	%	"Good" %	"Pass" %	"Fail" %
Admitted					
Bartlett	21	32	38	62	0
Other U.	18	27	50	50	0
NU.	11	17	27	73	0
Total	50	76	40	60	0
Continuing to apply	8	12	0	37	63
Entering another career	8	12	25	50	25
Total replying	66	100	33	56	11
No reply	6	7	0	50	50
TOTAL	72		30	56	14

For key see Table 36a.

In interpreting our results, it should be noted that while all our candidates were applying through UCCA to several university schools, they would not necessarily apply also to any non-university school. The number of those not getting a place in an architecture school therefore represents those who had failed to get a place in the universities of their choice, but they had not necessarily been rejected by non-university schools.

Academic quality of candidates

Tables 36a and b also show the academic quality, by A-level results, of the candidates. In 1963 overall 20 per cent obtained a 'good' performance as defined by UCCA (UCCA 1965 see p.32 for our description). It will be noted that 28 per cent of the men failed to gain 2 A-levels. The women's performance was better (Table 36a); 33 per cent obtained a 'good' performance and 10 per cent failed to gain 2 A-levels. (This reflects a general trend for women applicants to do better. In 1964 (UCCA 1965) 66 per cent of women entrants to all subject groups were graded 'good' at A-level as against 58 per cent of the men.) In our study (Table 36a) 45 per cent of the men who entered university architecture school had a 'good' performance at A-level while of those who entered non-university school only 14 per cent had a 'good' performance. The other two categories of men were on the average much weaker. Of those continuing to apply or entering another career a large proportion (two-thirds) had failed to gain 2 A-levels, and only 9 and 7 per cent respectively were 'good'. (The number of women is small and so the figures are less meaningful.)

Admission to other schools and selection for interview

In the interests of homogeneity in the following tables we have given figures only for the men educated in Great Britain. Table 37 shows the relationship between our decision to interview candidates, and their success in entering other schools. It gives the number of candidates interviewed and not interviewed by the Bartlett in 1963 who entered university or non-university schools, were continuing to apply, or entered another career. Candidates interviewed are tabulated under (1) Admitted to Bartlett (2) Offered place but failed to qualify at A-level, or Withdrew, or Offered reserve place but not admitted to the Bartlett, and (3) Rejected at Interview. Candidates not interviewed are those (4) Rejected at screening, (5) Not taking A-level mathematics and (6) those who Withdrew before interview.

Of the candidates taking mathematics at A-level who were interviewed but rejected, a greater proportion (70 per cent - col. 3) were admitted to another school than of those rejected before interview (47 per cent - col. 4); the relationship is significant at $p < .05$. Of those without mathematics 51 per cent (col. 5) were successful, compared with 55 per cent (col. 2, 3, 4) of those with maths (the grades obtained at A-level by the 2 groups, with mathematics and without mathematics, were similar in a study made of the 1964 applicants - see p. 35 and Table 12.) It would seem that in 1963 candidates without mathematics at A-level were not at a disadvantage in finding a place in architectural school.

TABLE 17. Candidates interviewed/not interviewed by the Bartlett and admission/non-admission to architecture school. Mon (Great Britain), 1963.

Candidates applying to Bartlett.	Interviewed				Not interviewed			
	Adm. B.	OP: FQ/WD	RJ	T	NM	WD	T	Total
	1	2	2		5	6		
Admitted to Bartlett	n	n	n	n	n	n	n	n
to Architecture School	21	0	0	21	0	0	0	21
Other Univ.	0	7	14	21	13	7	33	54
NU.	0	4	10	14	16	10	52	66
Continuing to apply	0	6	5	11	16	3	50	61
Entered another career	0	1	8	6	14	1	26	32
TOTAL	21	18	34	73	61	21	161	234
No reply	0	0	3	3	7	1	19	22

Adm. B. = Admitted to Bartlett

OP: FQ/WD = Offered place or reserve place but failed to qualify or withdrew application

RJ = Rejected

NM = Not taking A-level Maths

WD = Withdrew application before calling for interview

$\chi^2 = 4.57$ df 1 $p < .05$ Yates correction applied.

I. I. NI

Place : No place

TABLE 38. Assessment of applicants on paper qualifications showing those gaining a place and those not gaining a place in a school of architecture other than the Bartlett. Men (Great Britain) 1963.

n = 131

Bartlett Grade	Academic Record (App.)		Referee's Report		Candidate's Statement	
	Place	No Place	Place	No Place	Place	No Place
A	U 1	1	U 8	0	U 6	3
B	17	7	23	23	21	23
C	12	21	3	11	5	10
D	3	9	0	4	0	1
E	1	0	0	0	0	0
Total	34	38	34	38	32	37
		59		59		55
		131		131		124 *

U = University school

NU = Non-university school

Candidates who withdrew before interview (21), or those not taking A-level maths (61), i.e. candidates not considered for interview, are not included in this table.

U : NU + NP
AB : CDE
 $\chi^2 = 10.40$
df 1
P < .01

U : NU + NP
AB : CDE
 $\chi^2 = 13.86$
df 1
P < .001

U : NU + NP
AB : CDE
 $\chi^2 = 3.66$
df 1
P < .10 NS

* 7 statements not available : 2 in university school; 1 in non-university school; 4 with no place.

Table 38 shows the relationship between our grading of paper qualifications and success in entering other schools. The universities tended to favour the candidates to whom we had given high grades; thus they took a half of the A's and B's on Academic Record, and only one-sixth of the C's, D's and E's; about a third of the A's and B's on Referee's Report and one-sixteenth of the C's, D's and E's; a third of the A's and B's on Candidate's Statement and an eighth of the C's, D's and E's. The relationship between a place in a university school and paper qualifications is significant for Academic Record and Referee's Report at $p < .01$ and $p < .001$ respectively; that for Candidate's Statement was not significant. The university schools would be using the same Academic Record and Referee's Report information as we were using (though they would not necessarily evaluate it in the same way); the Candidate's Statement however was not supplied on the UCCA form. The relationship between acceptance by non-university schools and our grades on paper qualifications cannot be determined from these data, because, as mentioned above, though all the candidates would have applied to other university schools through UCCA, they would not necessarily have applied to non-university schools.

A-level results and selection for interview

The candidates called for interview had been selected mainly on their Academic Record at O-level, supported by their Referee's Report and Candidate's Statement; Table 39 shows the 152 men candidates screened for interview by the Bartlett in 1963. The interviewees were more successful than those not interviewed in subsequent A-level examinations. Compared with those not interviewed, nearly three times as many of those interviewed obtained an UCCA score of 7 to 14 at A-level, high Petch grades, and grades A, B, or C in mathematics; twice as many obtained A, B, or C in Physics. Among those taking Art, however, there was no difference in performance at A-level between the two groups. The relationship is significant for UCCA ($p < .001$), Petch ($p < .01$), Mathematics ($p < .01$), and Physics ($p < .01$).

Performance in architecture school

With the co-operation of the schools concerned we have followed the 1963 candidates and 1964 interviewees throughout their first three years in architecture school, i.e. to RIBA Intermediate level. Schools were asked to place students each year in the top (1), upper (2), lower (3), or bottom (4), quartile of their respective classes; to indicate who had qualified for RIBA Intermediate exemption in the minimum time; to show whether the student was considered excellent, good, average, weak, or very unsatisfactory, and to make any other comments as they wished. Replies were received from the following Schools.

University + Bristol
 + Cambridge
 + Edinburgh
 + Liverpool
 Manchester
 + Newcastle-upon-Tyne
 + Sheffield
 Strathclyde
 + Wales Institute of Science and Technology

Non-university * Birmingham - College of Art and Design
 Brighton - College of Art
 * Bristol - College of Science and Technology
 Canterbury - College of Art
 Hull - Regional College of Art
 Kingston upon Thames - College of Art
 Leeds - College of Art
 Leicester - College of Art and Design
 + London - Architectural Association
 + London - The Polytechnic
 + London - Northern Polytechnic
 London - Hammersmith College of Art and Building
 Manchester - College of Art and Design
 * Nottingham - College of Art
 + Southend-on-Sea - College of Technology

X Listed Cheltenham - College of Art
 Liverpool - College of Building

* Status in 1963. Since then Birmingham has become affiliated to the University of Aston, Nottingham School has been taken into the University of Nottingham, and Bristol College of Science and Technology is now the University of Bath.

+ Schools taking 1964 interviewees as well as 1963 candidates.

X "Listed" i.e., examinations not recognised by the RIBA.

(This represents all university schools except Belfast and Dublin. Of non-university schools, this represents all schools except those in Aberdeen, Dundee, Edinburgh, Glasgow, London - Brixton School of Building, Oxford and Portsmouth.)

In the following tables students placed in the two upper quartiles at the end of third year have been classified as "high" performers and those placed in the lower quartiles together with those who dropped out before third year as "low" performers. Students in university and non-university schools are tabulated separately. In 1963, 15 out of 34 students were in the high group in university schools while in non-university schools a smaller proportion, only 7 out of 33 students were in the high group. This was not so in the 1964 interviewees; they showed similar performance in both types of schools, 6 out of 18 being in the high group in university schools and 4 out of 11 in non-university schools.

(i) Performance and selection for interview

The performance of the 1963 candidates with A-level maths, who were interviewed or not interviewed and those without A-level maths, is shown in Table 40. Looking first at those with mathematics and those without mathematics, in university and non-university schools together, there is a very slight tendency for those with maths to do better than those without maths but not significantly so; one third of those with maths were in the high group in their class, while one-quarter of those without maths were so placed.

Among those with A-level maths, those interviewed did slightly better, but not significantly so, than those not interviewed. Among those who entered university schools, one half of those interviewed were in the high group while of those not interviewed, one third were so placed, and among those who entered non-university schools one third of those interviewed were in the high group as against one-fifth of those not interviewed.

(ii) Performance and paper qualifications

Table 41 compares performance at the end of three years with paper qualifications for the 1963 candidates and 1964 interviewees. (We compared candidates graded A or B with those graded C, D, E because in most cases we would not offer places to the latter and in order to apply X^2 test.) Looking at the performance in university schools, it will be seen that there is a positive, though not significant, relationship of performance with Academic Record. Of those graded A or B on Academic Record, 16 out of 32 as against only 5 out of 20 of the C's, D's or E's were in the high group. The relationship with Academic Record is clearer in 1963 than in 1964 as one would expect. There is a very slight negative relationship in the non-university schools. In both university and non-university schools there is a tendency for those graded low on Referee's Report to do less well. Thirty-two out of 81 of the A's and B's were in the high group while none of the 15 C's, D's or E's performed well. There was little difference between those graded high and low on Candidate's Statement.

(iii) Performance and A-level results

Table 42 shows for the 1963 candidates and 1964 interviewees the relationship between performance at the end of three years in architecture school, with

TABLE 39. Candidates interviewed and not interviewed by the Bartlett and Grades obtained at A-level following interview. Men (Great Britain) 1963.

n = 152

A-level performance	UCCA Score		Petch		Mathematics		Physics		Art	
	I	NI	Total	I	NI	Total	I	NI	Total	Total
High	31	12	43	24	9	33	27	9	36	33
Low	40	63	103	47	66	113	43	60	103	84
Total	71°	75°	146	71°	75°	146	70°	69°	139	117
							61°	56°		29°
										31°
										60

x ² test	high = 14.7 low = 6.1 I : NI high : low x ² = 12.16 df 1 p < .001	high = 1.3 low = 4.6 I : NI high : low x ² = 8.82 df 1 p < .01	high = A-C low = D-F I : NI high : low x ² = 10.58 df 1 p < .01 (Note: with high A-D low E-F, significance increased to x ² = 17.52 df 1 p < .001)	high = A-C low = D-F I : NI high : low x ² = 6.72 df 1 p < .01	high = A, B low = C-F

I = Interviewed.

NI = Not interviewed.

o 2 results not available	o 2 results not available	o 3 results not available	o 11 candidates did not take Physics 1 result not available	o 42 candidates did not take Art. 2 results not known
o 4 results not available	o 4 results not available	o 10 results not available	o 17 candidates did not take Physics 6 results not available	o 44 candidates did not take Art. 4 results not known

UCCA score (UCCA, 1968) is coded as follows:

the candidate's best performance in each subject, whenever obtained, is taken and translated into a score:

Grade A	= 5
" B	= 4
" C	= 3
" D	= 2
" E	= 1
Fail	= 0

Not more than three subjects are counted. Thus AAA = 15, the maximum score;
EE = 2, the lowest normal score for a pass.

TABLE 40. Candidates admitted to architecture school other than the Bartlett showing those interviewed and not interviewed by the Bartlett and their performance in architecture school. Men (Great Britain) 1963.

I University schools

n = 34

a. Candidates with maths

**b. Without
maths
n = 13**

Performance	I		NI	Total	NI
	Op	Rj	Rj		
high	2	9	4	15	5
low	5	5	9	19	8
Total	7	14	13	34	13

II Non-university schools

n = 38

n = 15

Performance	I		NI	Total	NI
	Op	Rj	Rj		
high	1	2	4	7	2
low	3	7	16	26	13
Total	4	9	20	33	15

I = Interviewed

NI = Not interviewed

Op = Offered place at Bartlett but took up place elsewhere

Rj = Rejected

Performance of 5 candidates in non-university schools not available (1 interviewed and 4 not interviewed).

Candidates with maths

maths : no maths

I : NI

high : low

high : low

$\chi^2 = .29$ df 1 NS

$\chi^2 = 1.43$ df 1 NS

performance in A-level examinations as classified by UCCA (1968) and Petch (1961), and grades obtained in Maths, Physics and Art.

In the university schools, there is a relationship between performance and UCCA score though not a significant one, one half of those with high UCCA scores performed well while only one-third of those with low UCCA scores performed well. Those in the high Petch categories performed better than those in the low Petch categories; this difference is significant at $p < .05$. Similarly, students with higher grades in Maths, Physics and Art were more likely to be in the high performance group in architecture school, but not significantly so. When the non-university schools are included with the university schools, the value of X^2 is increased for UCCA and Physics, and becomes significant at $p < .05$ and $p < .02$; it is very slightly increased for Maths; but is decreased for Petch.

Comparing these results with those of Bartlett students 1960-64 (see p. 72) we found in the latter group a significant relationship of performance with UCCA and Petch grades ($p < .001$).

(iv) Performance and interview decision

Although the decision to interview is related to subsequent performance in the 1963 candidates, the decision made at interview is not so related. Those candidates who were offered a place, or a reserve place, but went to other schools did not perform better at architecture schools than those rejected at interview; a quarter of those offered a place and a half of those rejected were in the high group of their classes (Table 40).

With the more intensive system of interviewing introduced in 1964 (described on p. 23), we used a finer scale 0 - 10 in grading candidates, and it is possible to compare grades given at interview with performance in other architecture schools. We found that on each of the various aspects assessed, those with high interview grades performed better than those with low grades. The differences are biggest in the global grade; one half of those graded high performed well while only one-fifth of those graded low performed well (and this was not related to Academic Record); the relationship is not however significant ($X^2 = 2.42$ df 1 $p < .20$). More detailed studies of the interview system are being made with the Bartlett students of cohorts 1964, 1965 and 1966, and preliminary results on performance in First Year are shown on p. 116. The separate interview ratings were not significantly related to performance but the correlations between global grade and overall performance came very close to being significant. Further comparisons on interview grade and later performance are required, and we would like if possible with the co-operation of other schools to follow up all our interviewees of 1965 and 1966.

TABLE 41. Candidates admitted to architecture school other than the Bartlett. Men (Great Britain)
1963 and 1964. Relation of paper qualifications to performance.

I University schools n = 34 in 1963, 18 in 1964.

Performance	Academic Record (App.)			Referee's Report			Candidate's Statement		
	AB	CDE	Total	AB	CDE	Total	AB	CDE	Total
High	11 1963 5 1964	4 5	21	15 21	0 0	21	11 16	4 5	21
Low	7 1963 8 1964	12 15	31	16 27	3 1	31	16 27	1 2	29
Total	32	20	52	48	4	52	43	7	50

II Non-university schools n = 38 in 1963, 11 in 1964.

Performance	Academic Record (App.)			Referee's Report		Candidate's Statement		
	AB	CDE	Total	AB	CDE	AB	CDE	Total
High	1963 1964	6 1	7	7 4	0 0	6 3	1 1	11
Low	1963 1964	19 0	19	15 7	11 0	19 5	6 2	32
Total	18	26	44	33	11	33	10	43

1963	U	$X^2 = 3.24$ df 1 NS		
1963 and 1964	U	$X^2 = 2.28$ df 1 NS		
	NU	negative		
	U + NU	$X^2 = 1.48$ df 1 NS		$X^2 = .16$ df 1 NS

Performance not available for 5 candidates in non-university schools.
Statement not available for 2 candidates in university schools, and 1 candidate in non-university school.

(v) Performance in RIBA Intermediate

We have also looked at the numbers of candidates gaining RIBA Intermediate in the minimum time, i.e. within three years* of entry. This is a more generous index of performance than that resulting from the tutors' division into high and low performance within each class (see above); some members of the low performance groups gained RIBA Intermediate in the minimum time. In the university schools 61 per cent of the 1963 candidates and 1964 interviewees achieved this; in the non-university schools 42 per cent.

We have looked at paper qualifications and success in gaining RIBA Intermediate and have found that those graded high by us on Academic Record were more likely to gain RIBA Intermediate at university schools in minimum time than the C's, D's and E's but the relationship is not significant. There was no positive relationship at non-university schools. Those graded high on Referee's Report were more likely to gain RIBA Intermediate in minimum time than those graded low at both university and non-university schools. A similar proportion in both high and low grades on Candidate's Statement gained RIBA Intermediate in the minimum time. The relationship of this criterion of success at architecture school with paper qualifications, as one would expect, is similar to that of high and low performance.

The results cited above indicate that there is a tendency for students whom we have rated high on the criteria we use to select for admission to the Bartlett, to do better on average at other schools of architecture than those we rate low. Since this is only a tendency, the possibility remains that we were rejecting some outstandingly good students. We have therefore taken a closer look at those students whose teachers had placed them in the top quartile of their class, and in particular those they described as "excellent".

Among the students we followed up 21 were placed in the top quartile of their class and 10 of them were stated to be "excellent" (Table 43). Of these "excellent" students 4 (from the 1963 cohort) were not interviewed by the Bartlett; two because they had withdrawn before interview, one because his high grades in Referee's Report and Candidate's Statement were outweighed by the fact that he had only got a 'D' Academic Record and had placed us third choice, and one because he had placed us third in his preference list (without having outstanding grades) so he would probably have gone elsewhere even if we had offered him a place. The remaining 6 "excellent" students were invited to interview in either 1963 or 1964; 2 of these were offered a place (1 withdrew, and 1 failed to get Mathematics at A-level); 1 was placed on the reserve list; 3 were rejected at interview.

* At one school students take examinations equivalent to Intermediate in the Fourth Year. These students have been omitted.

In assessing the 10 applicants who were subsequently described as "excellent" we therefore made 3 "false negative" judgments, in that we rejected 4 of these candidates and placed one on the waiting list. One of these errors was made at selection for interview; the other four occurred at interview. In assessing the potentialities of the total 21 top quartile students we made 13 "false negative" judgments (marked * and + in Table 42). We can compare these figures with the "false positives" made in admitting students to the Bartlett in 1963 and 1964. Of the total of 42 men admitted 13 can be considered unsatisfactory; 1 changed to another university course; 4 left after a year or more in the school having failed examinations and 7 completed the degree in more than minimum time.

It will be noted that 3 of the 10 "excellent" students had C and one had D grading for their Academic Record, but that only one of them had a grade as low as C for either Referee's Report or Candidate's Statement. 13 of the 21 top quartile students had C or D Academic Record, but among these only 3 had grading of C on either Referee's Report or Candidate's Statement. As to A-level Mathematics, only one of the top quartile students had not taken it, and another had failed it; both were in non-university schools. The indications are that candidates should not be rejected on grounds of low Academic Record alone. Any inference made from these figures assumes that students who performed exceptionally well at other schools of architecture would have done so also at the Bartlett. We cannot, of course, get any evidence that this is so, and the fact that in non-university schools there is no clear positive relationship between performance and previous Academic Record emphasizes the differing effects of the learning environments.

In summary, it seems that the criteria we used to choose candidates for admission to the Bartlett School tended to select those who were more likely to be admitted to other schools of architecture, and to perform better in architecture courses. There is no evidence that our policy of rejecting candidates who do not take A-level Mathematics deprives us of a disproportionately large number of potentially good students. On the other hand the fact that we made 13 "false negative" and an almost equal number of "false positive" decisions in selecting our entrants in 1963 and 1964 to the Bartlett gives little cause for self-congratulation. These findings emphasize the need to make more detailed clinical studies of students who perform exceptionally well, or exceptionally badly, and the environments in which they do so. If we are able to follow up the 1963 and 1964 candidates whose test scores we have, some light may be thrown on this.

2.3.1.2. 61. Graduates admitted to universities abroad other than the British, Man (Great Britain) 1953 and 1954, Evaluation of O.C.E.A. level examinations in performance.

1 University students 0 = 24 in 1953, 10 in 1954.

Performance	O.C.E.A. Score		T		T		T		T		T		T		T		T		T	
	14-17	8-13	1-3	4-6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
High	11	10	6	0	21	11	14	5	7	21	0	10	7	11	21	9	12	2	3	15
Low	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	11	10	7	0	21	11	14	5	7	21	0	10	7	11	21	9	12	2	3	15

2 One university student 0 = 20 in 1953, 11 in 1954.

Performance	O.C.E.A. Score		T		T		T		T		T		T		T		T		T	
	14-17	8-13	1-3	4-6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
High	0	0	0	0	10	1	1	0	0	10	1	1	4	0	9	1	3	2	4	7
Low	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	10	1	1	0	0	10	1	1	4	0	9	1	3	2	4	7

1980 χ^2 test @	$\chi^2 = 1.01$ df 1 NS	$\chi^2 = 1.14$ df 1 p < .05	$\chi^2 = .64$ df 1 NS	$\chi^2 = 2.63$ df 1 NS	NS
1980 and 1981 χ^2 test @	$\chi^2 = 1.10$ df 1 NS	$\chi^2 = 4.05$ df 1 p < .05	$\chi^2 = 1.00$ df 1 NS	$\chi^2 = 2.78$ df 1 NS	NS
1980 and 1981 χ^2 test @ and MU	$\chi^2 = 4.05$ df 1 p < .05	$\chi^2 = 1.10$ df 1 NS	$\chi^2 = 1.88$ df 1 NS	$\chi^2 = 6.37$ df 1 p < .02	NS

numbers too small to calculate χ^2

1980: Performance not available for 5 candidates in non-university schools and UCCA score for 2 candidates (1 U and 1 NU)

1981: Petrich for 1 candidate (NU)

Maths for 4 candidates (1 U and 3 NU)

Physics not taken by 15 candidates

(4 U in high group,
3 U in low group

and 4 NU in high group,
4 NU in low group)

Art not taken by 34 candidates

(7 U in high group,
10 U in low group

and 4 NU in high group,
18 NU in low group)

1980: Physics not taken by 7 candidates (3 U in high group, 3 U in low group,
and 2 NU in low group)

Art not taken by 13 candidates (3 U in high group, 7 U in low group,
and 1 NU in high group, 3 NU in low group).

TABLE 43. Top quartile students at other schools, and Bartlett selection.

1963 candidates in top quartile

University schools

Student	Tutor's grade	Bartlett selection					Not interviewed Reason.
		Ac. Rec.	RR	CS	Int.		
1	* Exc.	D	B+	A	-		Ac. Rec. & 3rd choice 3rd choice Wd Wd
2	Exc.	B	B	B	-		
3	Exc.	B	B+	B	-		
4	Good	C	B	-	-		
5	* Exc.	C	B	C	Rj		
6	+ Good	B-	B	B	Rj		
7	+ Good	B+	B	B+	Rj		
8	+ Good	B	B	C	Rj		

Non-university schools

9	Exc.	B	B	B	-		Wd
10	+ Good	D	B	C+	-		Ac. Rec.
11	+ Good	C-	B	B-	-		Ac. Rec.
12	+ Good	D	B	B-	-		Ac. Rec.
13	+ Good	C-	C+	-	-		No Maths.
14	* Exc.	C	B	B-	RL		
15	* Exc.	B+	B+	B+	Rj		

1964 candidates in top quartile

University schools

16	Exc.	C	B	A	Ac/Wd	
17	* Exc.	B	B	A	Rj	
18	Good	B+	B+	C	Ac/Wd	

Non-university schools

19	Exc.	B	B	C	Ac/PQ	
20	Good	B	B	A	Ac/Wd	
21	+ Good	C+	B+	B	RL	

Note: See p. 93 for description of Tutor's grade.

- "False negatives" at selection by Bartlett on students graded "Excellent"
- "False negatives" at selection by Bartlett on students graded "good"

13. RELATION BETWEEN PERFORMANCE IN FIRST YEAR AND SELECTION
AND OTHER CRITERIA, COHORTS 1964-66.

The students who entered the School during 1964-66 as a result of the selection procedure described under Selection p. 16-24 had completed the first year of the Bartlett course by the summer of 1967. They had experienced a uniform method of selection and a fairly uniform first year of study at the Bartlett, though during this time there was considerable rearrangement of courses, and much discussion took place about teaching and assessment techniques. The new B.Sc. examination regulations began to come into effect in 1966, but did not substantially influence the first year course, and for the purpose of this follow-up study, the new method of assessment in course units has not been used.

It is possible to determine how far the performance of these students during the first year, in terms of examination and studio portfolio marks, was predictable by the information available at the time of selection, whether or not it was explicitly used for selection. The main question of practical importance is whether the predictive value of the information normally available on the UCCA application form can be improved by the addition of an extended Candidate's Statement, interview gradings, A-level results, and intelligence or personality test scores.

This section differs from the preceding in several important ways. As already pointed out, the three cohorts 1964-66 are the first to have experienced a uniform method of selection; they are large enough to allow separate analysis for each cohort, and by more powerful statistical methods. It is also numerically feasible to omit female and overseas students from the samples on the grounds that differing developmental cultural and motivational characteristics may confound predictor-criteria relationships observable in the male, British samples.

Since the relationships reported in this section are for first year performance only, they are not directly comparable with the results given in the previous section, on the final performance in the Bachelor's Degree course of cohorts 1960-64. It is anticipated that some of the relationships observed here may not be found when the predictors are related to performance in later years of the course.

The fifteen predictors studied consist of the following. Three measures were derived as described above (pp. 17 ff) from paper qualifications, namely two from the UCCA form, Academic Record at time of application (AR App.) and Referee's Report (RR), and the Candidate's Statement (CS) which applicants invited to interview were asked to supply. The Academic Record at entry (AR Ent.) was assessed in the same way as the AR App. but included examinations (usually A-levels) taken after the interview. The Petch category summarizes A- and S-level results by an empirical formula, into a six-point classification (see footnote to Table 29, p. 75 Petch, 1961). The UCCA score was classified as summarized in their Fifth Report (see footnote to Table 39, UCCA, 1968). This classification is similar but not the same as the classification of "good" A-levels (UCCA 1965) referred to on p. 32 and p. 72. There were six interview ratings, (1) sensitivity to environment, (2) range of interests, (3) ability to organize material conceptually, (4) ability to organize material concretely, (5) likeability, and (6) global grade. (The interview ratings 1, 3 and 4 are those of individual interviewers, and ratings 2, 5 and 6 are each the average of the ratings given by the three separate interviewers, see p. 24).

The remaining predictors are the three AH5 scores, Parts I, II and Total (these were not used for selection).

The seven performance criteria are the results of the four first year written examinations (History of Architecture, Theory of Structures, Aspects of Biological Science in relation to Architecture, and Scientific Principles of Building); the mark given for studio course work; an equally weighted composite of the four written examinations - and an overall measure of performance to which the studio course work and the written examinations contribute equally. (This last corresponds with the manner in which a class in the degree examination is arrived at.) The written examinations were marked in the conventional manner, and returned as percentages.

Statistical Methods

As in the other sections of this monograph, statistical treatment of data has been kept to a minimum. All variables, predictors and criteria, were normalized and transformed into standard scores to facilitate the derivation of averaged and composite scores. Product-moment correlations among the 22 variables were calculated for each cohort of students separately. The significance of each of these correlations was tested, both for each separate cohort, and for the three cohorts taken together. For the latter purpose instead of pooling the three cohorts a value T was calculated by the formula:-

$$T = \frac{\sum_{i=1}^k \alpha_i t_i}{\sqrt{\sum_{i=1}^k \alpha_i^2}}$$

where $\alpha_i = \sqrt{n_i}$, $i = 1, 3$ and t_i is the value of t for the i th sample for a particular correlation coefficient. n_i is the number of students in the i th cohort. This use of T enables one to avoid any of the assumptions of homogeneity which would be involved in pooling the three cohorts, and calculating a single ' t '. For example, it was thought preferable not to assume that the scales of the subjective grades (especially RR, CS, and the performance criteria) were comparable from one year to the next, neither in their raw nor their transformed state; pooling the cohorts would have implied homogeneity. T represents the sum of a number of independent, conventional ' t ' tests, and for the value of ' n ' in the present context is approximately normally distributed with zero mean and variance of one. Values of T are interpreted in the same way as t , with $\sum_{i=1}^k (n_i - 2)$ degrees of freedom.

Selected predictors were combined in a variety of ways by means of multiple correlation with the criterion of overall performance. The significance of the multiple coefficients was examined by an F test of the analysis of variance for the regression. Since the multiple correlation coefficient is the maximum correlation between the criterion variable and a weighted combination of predictor variables, it capitalises on chance deviations even more than the simple correlation coefficient. This effect is greater when the multiple correlation is based on a small sample or a relatively large number of predictors. For this reason we should expect fluctuation in the multiple correlations between the three samples reported on here. Absence of fluctuation between samples can be taken to indicate that the multiple correlations are not as inflated as one would normally expect.

All correlations were calculated on an IBM 360 computer.

Results

(1) Interrelation of predictors of performance

Table 44 gives the product moment intercorrelations of the fifteen predictors. It will be noted that, of the paper qualifications available at interview, AR App. and RR are comparatively highly correlated, the relationship reaching significance at $p < .01$ in 1964 and 1965. CS, however, is not significantly related to either AR App. or RR. As would be expected, AR App. is consistently fairly well related to AR Ent., reaching $p < .05$ in 1966: it is however less strongly related to Petch and UCCA, which are of course strongly related with each other. It is notable that RR is more strongly related to the measure of academic performance at the time of application than later, whereas in the case of CS the reverse is true.

TABLE 44. Intercorrelation of 15 predictors Bartlett entrants, 1964-66.

Predictors	Year	AR App.	RR.	CS.	Petch	UCCA.	AR Ent.	I	AH ₅ .		Interview					
									I	T	1	2	3	4	5	6
AR. App.	1964	-	67*	-16	18	10	33	01	-44+	-28	21	46+	17	22	-05	52+
	1965	-	46*	-20	26	20	32	12	36+	27	04	11	-14	02	04	02
	1966	-	16	-23	11	24	43+	26	27	48+	03	02	-22	/	-26	-16
RR.	1964	-	-	-15	27	25	27	20	-26	-06	34	14	-26	12	-05	38
	1965	-	-	10	17	19	32	-03	26	16	10	08	02	28	04	08
	1966	-	-	05	18	22	30	05	14	14	26	10	-19	/	10	20
CS.	1964	-	-	-	16	24	24	-11	-11	-10	23	-32	-06	-03	03	02
	1965	-	-	-	30	28	20	17	15	16	07	17	13	11	16	29
	1966	-	-	-	32	33	27	12	19	14	16	-10	11	/	08	-12
Petch	1964	-	-	-	-	82*	79*	-08	06	06	60*	-02	-16	15	-10	12
	1965	-	-	-	-	90*	87*	10	32	23	-16	12	06	04	09	11
	1966	-	-	-	-	93*	79*	07	08	07	57*	17	01	/	-05	-02
UCCA.	1964	-	-	-	-	-	82*	-12	02	-06	53+	14	03	33	-18	21
	1965	-	-	-	-	-	88*	15	18	20	-18	10	07	-09	18	12
	1966	-	-	-	-	-	88*	-03	23	12	52*	09	-18	/	-20	-16
AR. Ent.	1964	-	-	-	-	-	-	-20	-08	-23	62*	32	-02	36	-33	30
	1965	-	-	-	-	-	-	35	46*	47*	-16	10	04	-14	07	05
	1966	-	-	-	-	-	-	03	28	21	39+	14	-20	/	-16	-18
Allg. I	1964	-	-	-	-	-	-	-	16	81*	-28	-18	19	-35	13	20
	1965	-	-	-	-	-	-	-	50*	85*	12	-03	-05	-31	-08	01
	1966	-	-	-	-	-	-	-	-01	69*	16	20	28	/	12	15
II	1964	-	-	-	-	-	-	-	-	60*	-09	-01	-16	17	10	-06
	1965	-	-	-	-	-	-	-	-	84*	21	07	16	05	-06	05
	1966	-	-	-	-	-	-	-	-	68*	02	-29	-43+	/	10	-35

-	-32	-33	03	-30	20	-00
-	23	04	08	-20	-14	02
-	13	-03	-08	/	13	-13
	-	28	-05	06	25	30
	-	37+	01	17	08	40+
	-	66*	-04	/	26	40+
		-	52+	38	-04	58*
		-	40+	-08	53*	83*
		-	23	/	34	59*
			-	-12	20	40
			-	-10	28	51*
			-	/	43+	56*
				-	-18	46+
				-	-04	14
				-	/	
					-	32
					-	69*
					-	71*
						-
						-
						-

Product moment correlations; decimal points omitted.
n = 1944, 21; 1945, 31; 1946, 26.
* $p < .01$ + $p < .05$ / missing data.

(ii) Interrelation of criteria of performance

Table 45 gives the intercorrelation of the criteria, and it will be noted that although there are variations from year to year, there being some negative correlations in 1966, the correlations for the combined three years are positive and in some cases fairly pronounced. In particular, the correlation of .48 between studio work and the total of four written examinations is interesting, in view of the current belief that ability in design is not positively related to ability in written examinations.

(iii) Relation of predictors to criteria

Table 46 presents the correlation of each of the seven criteria with the fifteen predictors. Since we are dealing with small samples of students and with relatively large numbers of predictor and criterion variables, it is important to look for relationships that do not fluctuate widely from one year to another. It will be seen that there is a good deal of variation in the coefficients from year to year. Unless this can be attributed to some particular change in the nature of either predictor or criterion, it must be presumed to be random variance. All the predictors, with the exception of the Petch and UCCA categories, and the AH5 scores, are subjective gradings, but it will be noted that they are no more unstable in their relationships with criteria than are the more objective ones. Since both predictors and criteria show variations in their interrelationships from year to year, it seems simpler therefore to regard fluctuations here as being due to chance deviations.

Of the information available for the purposes of selection, that provided by the UCCA form, AR App. and RR, seems of little value for predictive purposes, although the correlations of AR App. with studio mark, and AR App. with overall performance come near to being significant when taken over the three years ($T = 1.87$ and 1.82 respectively). RR seems very weak as a predictor; indeed the partial correlation between RR and overall performance, with the effect of AR App. removed, is negative in 1964 and 1965 ($-.13$ and $-.06$ respectively), though in 1966, $+.20$. To some extent the low validity coefficients reported here are partly due to the narrow range of variability in the predictor measures for the students who entered the Bartlett, since the candidates who were not given a selection interview tended to have low grades for AR App. and RR. If we imagine the predictors correlated with the criteria for all those who applied for admission, and not just for those few who actually entered the School and had high grades on the predictors, the validity coefficients for the total population would be larger, provided that the regressions are linear. But, as this restriction in range applies to some extent to all the predictor variables, comparisons between them are not invalid.

TABLE 45. Intercorrelation of criteria for Bartlett entrants 1964-66.

Performance Criteria		His.	Struc.	Biol. Sc.	SPB	Studio
History	1964	-	45+	38	66*	51+
	1965	-	38+	40+	71*	64*
	1966	-	53*	51*	-40+	-18
	1964/5/6	-	45*	43*	40*	37*
Structures	1964		-	59*	39	35
	1965		-	01	34	24
	1966		-	46+	-17	07
	1964/5/6		-	34*	19	22
Biological Sciences	1964			-	38	39
	1965			-	36+	29
	1966			-	-00	37
	1964/5/6			-	25+	34*
Scientific Principles of Building	1964				-	51+
	1965				-	62*
	1966				-	34
	1964/5/6				-	51*
Studio	1964	51*	35	39	51+	-
	1965	64*	24	29	62*	-
	1966	-18	07	37	34	-
	1964/5/6	37*	22	34*	51*	-
All written exams	1964					59*
	1965					59*
	1966					22
	1964/5/6					48*

Product moment correlation coefficients; decimal points omitted.
Combined years, averaged correlations by a transformation.

n = 1964, 21; 1965, 21; 1966, 20.

* p < .01 + p < .05

TABLE 45. Correlation of predictors with performance criteria, Bartlett entrants 1964-66.

Criteria	Year	AR App.	RR	CS.	Petch	UCCA.	AR Ent.	AH ₅ :			Interview					
								I	II	T	1	2	3	4	5	6
Biology	1964	09	05	32	18	-15	06	14	00	19	05	-16	-25	-14	-19	-00
	1965	-02	-02	32	27	28	35	04	16	13	-03	25	16	-24	18	27
	1966	21	05	09	24	19	06	-04	03	-00	08	-06	11	/	-13	11
	T			2.05+	2.05+											
Drama	1964	17	09	18	62*	45+	54+	05	-16	-04	42	24	17	16	-16	31
	1965	-00	02	37+	43+	36+	31	-06	09	06	-00	08	28	13	15	22
	1966	25	-05	-05	10	-01	-01	16	16	23	-23	-32	33	/	06	12
	T				3.69*	2.53+	2.21+						2.34+			
Biological Sciences	1964	19	20	26	40	34	37	19	-08	13	22	08	01	-07	-08	16
	1965	-01	-17	14	04	08	07	07	-05	03	01	16	14	-59*	26	10
	1966	02	32	41+	35	31	20	26	17	27	30	-12	10	/	-00	18
	T			2.34+	2.17+	2.00+										
Scientific Principles of Biology	1964	23	13	22	30	07	32	02	-16	06	-09	-06	-11	-08	-43+	01
	1965	26	-01	21	20	13	29	16	38+	26	-05	17	09	-20	21	15
	1966	09	02	-09	13	16	23	38	10	33	27	23	-02	/	15	03
	T						2.47+									

Studio	1964	23	08	20	07	02	15	-38	-00	-26	10	34	-14	37	-12	19
	1965	19	15	27	20	13	31	17	40+	25	-02	03	24	-12	23	12
	1966	23	18	25	06	13	27	41+	31	43+	11	07	08	/	31	16
T				2.14+			2.22+									
Four Written Exams. (Un-weighted composite).	1964	19	13	33	47+	23	42	02	-17	01	20	03	-11	-03	-34	10
	1965	08	-11	34	31	28	32	04	17	13	04	23	21	-21	29	29
	1966	19	15	15	36	28	22	32	10	29	22	-02	24	/	03	21
T				2.45+	3.42*	2.35+	2.81*									
Overall Performance (Studio & Exam.).	1964	26	08	31	31	16	33	-25	-12	-18	14	21	-11	21	-29	17
	1965	14	03	36+	27	21	35	14	34	25	01	14	22	-20	31	22
	1966	25	23	23	25	23	29	44+	25	43+	19	06	22	/	21	26
T				2.72*	2.44+		2.92*									

n = 1964, 21; 1965, 31; 1966, 26.

Decimal points are omitted from correlation coefficients.

Only significant values ($p < .05$) of T are included; + $p < .05$ * $p < .01$ / = missing data.

Candidate's Statement is a better predictor than AR App. or RR, giving significant correlations with History, Biological Science, Studio, all written examinations and overall performance. This is surprising and gratifying in view of the way in which the measure was derived (see p.19). It is conceivable that it is measuring an aspect of motivation untapped by AR App. and RR.

As might be expected, two of the measures of academic ability which include post-interview performance in written examinations (A-levels) have higher correlations with Bartlett performance than does Academic Record on Application. Academic Record on Entrance gives a correlation with overall performance significant at $p < .01$ and Petch at $p < .05$. It is interesting to note that while both measures correlate positively ($p < .01$) with combined written examinations, the Petch coefficients are higher than those of AR Ent. The reverse relation holds with studio performance, with which Petch is not significantly related, but with which AR Ent. is, at $p < .05$. The broader reference of AR Ent. as a global assessment, compared with Petch as a measure of A-level performance alone, appears to facilitate its prediction of successful performance in other than written examinations. The UCCA grade, although very highly correlated with Petch and AR Ent., seems not to be so effective a predictor in general. It gives no significant correlation with overall performance. The best predictor of overall performance is AR Ent., then CS and then Petch.

In general, the remaining selection variables, the interview ratings, are unpromising as predictors; in particular the absence of a consistent relationship between the interview assessment of "ability to organize material concretely" and studio work is notable. Only the interview global grade (6), which it should be noted is based on the assessments of all three members of the interviewing team, and which is more closely correlated with AR App., RR, and CS than are the individual ratings, shows the desired consistency or approaches significance in its relationships with criteria. The correlations between interview final grade and overall performance come very close to being significant, taken over the three years together ($T = 1.93$).

The coefficients associated with the three AH5 scores are by far the least stable. The correlation of AH5 Total with overall performance ranges from $-.18$ in 1964, through $+.25$, to the comparatively high $+.43$ in 1966. The negative correlations associated with AH5 scores in 1964 are difficult to account for, particularly in view of the subsequent relatively high positive values. It may be noted here, however, that correlations between AH5 and interview decision for the total groups interviewed tended to be negative in 1964, and positive in the other two years (Table 21, p.48). (In view of the negative coefficients for 1964, values of T were not calculated.) AH5 may be predicting studio performance better than examination results, particularly in the scores for the non-verbal part (Part II).

TABLE 47. Correlation of combinations of selected predictors with overall performance criterion.

Predictors used in selection						Correlation with overall performance		
AR App.	RR.	CS.	Int.	AR Ent.	AH5T	1964	1965	1966
(a) X						r = 26	14	25
	X					08	02	23
		X				32	36+	23
			X			17	22	26
				X				
X	X					R = 28	14	32
X		X				44	42	39
X	X	X				45	44	43
X	X	X	X			45	45	54
X		X	X			44	43	54

(b) "Optimal" combinations of predictors

X		X				R = 44	42	39
		X		X		41	46+	33
			X		X	24	33	54+
X	X	X				45	44	43
		X	X	X		42	47	47
			X	X	X	36	42	60+
X	X	X			X	46	46	50
		X	X	X	X	43	48	62+
X	X	X	X		X	46	47	61
	X	X	X	X	X	43	49	62

Decimal points omitted

+ $p < .05$

TABLE 47. Correlation of combinations of selected predictors with overall performance criterion.

(c)

						Regression			
AR App.	RR	CS	Int	AR Ent.	AH5T	1964	1965	1966	1964
X		X				R= .44	.42	.39	.93 + .28ARA + .51CS
		X		X		.41	.46 ⁺	.33	1.75 + .35CS + .26ARE
			X		X	.24	.33	.53 ⁺	4.41 + .18INT - .17AH5T
X	X	X				.45	.44	.43	1.34 + .36ARA - .16RR + .50CS
		X	X	X		.42	.47	.44	1.39 + .36CS + .10INT + .23ARE
			X	X	X	.36	.42	.56 ⁺	3.38 + .09INT + .27ARE - .11AH5T
X	X	X			X	.46	.46	.50	1.34 + .34ARA - .15RR + .49CS - .04AH5T
		X	X	X	X	.43	.48	.58	1.92 + .35CS + .10INT + .21ARE - .10AH5T
X	X	X	X		X	.46	.47	.57	1.58 + .34ARA - .15RR + .49CS + .01INT - .04AH5T
	X	X	X	X	X	.43	.49	.58	1.82 + .03RR + .36CS + .10INT + .20ARE - .10AH5T
X	X	X	X	X	X	.48	.52	.59	1.38 + .31ARA - .18RR + .42CS - .03INT + .18ARE - .01AH5T

ARA = AR App.
ARE = AR Ent.

equations	
1965	1966
1.44 + .25ARA + .41CS	1.55 + .34ARA + .33CS
1.61 + .30CS + .31ARE	2.58 + .18CS + .29ARE
2.29 + .21INT + .25AH5T	.89 + .32INT + .48AH5T
1.78 + .34ARA - .19RR + .44CS	.97 + .31ARA + .18RR + .32CS
1.23 + .27CS + .13INT + .32ARE	1.34 + .16CS + .30INT + .28ARE
1.61 + .20INT + .31ARE + .11AH5T	.19 + .31INT + .22ARE + .43AH5T
1.51 + .29ARA - .19RR + .41CS + .14AH5T	.66 + .13ARA + .16RR + .23CS + .35AH5T
1.05 + .26CS + .13INT + .28ARE + .08AH5T	-.10 + .12CS + .31INT + .19ARE + .42AH5T
1.21 + .27ARA - .19RR + .37CS + .12INT + .15AH5T	-.23 + .03ARA + .15RR + .18CS + .30INT + .41AH5T
1.49 - .15RR + .26CS + .13INT + .31ARE + .09AH5T	-.39 + .11RR + .13CS + .30INT + .15ARE + .41AH5T
1.07 + .22ARA - .24RR + .32CS + .12INT + .28ARE + .05AH5T	-.30 - .06ARA + .11RR + .10CS + .31INT + .18ARE + .44AH5T

If it could be clarified, this relationship would be most interesting.

Tables 47 a and b present multiple correlations of selected predictors with one of the criteria - overall performance at the Bartlett. The first question to be answered is how well do the various combinations of the information actually used at selection, predict performance? It is clear from Table 47 that the combination of AR App. and RR, which is used for selecting candidates for interview, is little better than AR App. alone, with the exception of a slight increase in 1966. AR App. and CS is a better combination than the other two possibilities, and only very marginally inferior to all three predictors together. The addition of the fourth predictor involved in the selection procedure, the interview final grade, only raises the coefficients appreciably in 1966.

The coefficient of determination, that is the percentage of the variation of the criterion which is due to the multiple regression on it of the four selection variables, is not high. In 1964 and 1965 it is only 20 per cent, and in 1966 29 per cent. The ability to predict only 20 per cent - 30 per cent of a criterion's variance is not very promising in a selection situation which deals with comparatively small numbers of students. However, the stability of coefficients between samples is more encouraging: and if one bears in mind the restriction in the range of the selected students' scores on the predictor variables, the size of the coefficients does suggest that the use of these variables in selection is not entirely unjustified. In the light of these results, the extended CS is a useful addition to the UCCA form, for selection at the Bartlett; but the value of the more time-consuming interview procedure for selection is not clearly demonstrated.

Two additional variables, (AR Ent. and AH5 T), which though not used in selection hitherto might conceivably be used in future, were added to those used at selection, and a selective search was made for the "best" combination of two, three, four and five predictors for each of the three samples. Although all possible combinations were not tested, those appearing in Table 47b appeared to be optimal. For the sake of comparison, all three values of R for any set of predictors are listed in Table 47c, together with the associated regression coefficients; the optimal value for each year is underlined. Multiple correlations of all six predictors with the performance criteria are also given.

It is apparent that little is to be gained from combining more than two predictors. (It was assumed that one would look for an increase in the value of R of at least .05 for the addition of each additional predictor.) Apart from the peculiar power of the interview and AH5 T in 1966, there is an acceptable stability between years for the coefficients involving the other variables. When considering

AR Ent. in combination with other predictors, as opposed to it when alone (Table 46), there is no evidence for preferring it to AR App. Until further samples are available to cross-validate the relationships observed in 1966, the combination of CS with AR App. seems the most efficient and convenient.

The Petch and UCCA categories were not included as predictors on the multiple regressions quoted here. There correlation with overall performance in each year was somewhat smaller than that of AR Ent., which anyway seems to be a rather more interesting variable (c.f. p. 116). When the Petch category was combined with other predictors in a number of trial regressions, at best it only raised the coefficient for one sample by .04 over that in which AR Ent. was substituted; in most cases it depressed the coefficients obtained by substituting AR Ent. (AR App. and AR Ent. were not included together in any of the combinations of predictors since conceptually the latter grade included the former.)

Because the principal use of the DPI in this study has been for descriptive rather than predictive purposes, only a brief report is given here on its relation to performance in first year. Table 48 gives the correlation of the DPI scales with overall first year performances for the three years separately. There are only four significant correlations, which in view of the high intercorrelation of some DPI scales are probably no more than would be expected by chance. In 1964 'oral aggression' (OA) correlates negatively with performance ($p < .01$), and in 1965 'initiative' (EI) and 'exhibitionism' (Pe) correlate positively ($p < .01$) and 'interest in exploration and adventure' (Pi) negatively ($p < .05$). We may note that 'interest in exploration and adventure' has been observed (p. 51) to correlate positively and significantly with the Referee's Report grading and 'exhibitionism' with the grade for Candidate's Statement. 'Interest in exploration and adventure' and 'initiative' were relatively highly favoured characteristics in the candidates to judge by the interviewers' ratings of them (Table 22, column 4). 'Exhibitionism' was a trait prominent by its relative absence in the whole group of 260 interviewees when they were compared to the general student population (column 1).

Interpretation of Table 48 is particularly difficult in view of the discrepancy in the sign of coefficients for different cohorts on many of the scales. It is possible in some cases to trace this discrepancy to differences between the mean scores of the three cohorts on a particular scale. For example the 1964 cohort have a relatively high score for 'exhibitionism' (Pe) as compared to the other two cohorts, and to the remainder of all the candidates for whom DPI scores are available. It is possible that the discrepant negative coefficient in 1964 is due to an initial 'excess' of 'exhibitionism'. The majority of discrepancies, however, are uninterpretable at present except as random effects.

TABLE 48. Correlation of DPI scales with overall performance in first year for Bartlett entrants 1964-66.

DPI scales		1964	1965	1966
H	Hypocrisy, social conformity	15	-03	06
Wp	Liking for passivity	-25	-03	-36
Ws	Liking for seclusion	04	03	-07
O	Orality	01	16	27
OA	Oral aggression	-58*	24	-17
Od	Emotional dependence	-21	-16	-09
Om	Need for movement	-10	-02	35
Ov	Verbal aggression	-30	11	-09
Oi	Impulsiveness	14	-06	-07
Ou	Unconventionality	-20	32	22
Ah	Hoarding	12	-03	16
Ad	Attention to details	15	04	13
Ac	Conservatism	29	-27	-17
Aa	Submissiveness to authority	16	-28	-06
As	Authoritarianism	12	-06	28
AI	Insularity	25	-19	-08
P	Phallic symbols	39	-28	13
Pn	Feminine narcissism	-27	-18	24
Pe	Exhibitionism	-38	46*	18
Pa	Drive for achievement (active)	21	-10	-21
Ph	Drive for achievement (passive)	01	17	-22
Pf	Sensitivity and imagination	-17	-20	09
Pi	Interest in exploration and adventure	28	-36+	04
S	Sexuality, lack of sexual repression	02	10	07
TI	Tactile and handicraft interests	-08	-06	12
CI	Creative interests	-15	14	13
M	Masculinity	17	-13	-18
F	Femininity	-04	04	37
MF	Liking for social roles	09	-04	12
SA	Liking for social activities	01	08	11
C	Interest in children	-26	03	-02
EP	Ego-defensive persistence	06	25	32
EI	Initiative	38	47*	17

Product moment correlation coefficients; decimal points omitted

n = 1964, 21; 1965, 31; 1966, 26.

* $p < .01$ + $p < .05$

There are four scales which show consistency of sign between cohorts, have relatively marked coefficients associated with them, and are intuitively interpretable in the present context. 'Ego-defensive persistence' (EP) and 'initiative' (EI) are positively correlated with performance; while 'passivity' (Wp) and 'emotional dependence' (Od) are negatively correlated. These trends are very much in line with what one might expect if the DPI scales are valid. It is encouraging that high 'initiative' and low 'passivity' and 'emotional dependence' were apparently favoured characteristics on the interview grading and thus in the selection procedure (Table 22, column 4). The relative disfavour there of high scores for 'ego-defensive persistence', with the result that accepted candidates scored significantly lower as a group (Fig. 3d) than those rejected, is not easy to understand, and is particularly disappointing in view of its positive relationship with performance. (Although this positive relationship may in itself reflect a process 'compensating' for the low scores of students entering the School.) It is perhaps worth adding that preliminary factor analyses of the DPI show that one of the former (EI) and the two latter scales respectively define two (unipolar) factors of the six main factors which seem to be present. In this sense the trends may represent fairly fundamental processes.

Future work

This section has of necessity reported an interim stage of the follow-up of the 1964-66 entrants, and much work remains to be done. When they have been followed through to the completion of their Bachelor's Degree course, a more extensive study will be made to see which characteristics of self-image at the time of selection are associated with successful completion of the course. It will be possible to compare the characteristics of successful students as between successive years of the course, as well as of differential success in written examinations and studio work. An important feature of this future work will be a factor analysis of the DPI scales to reduce the number of variables to be correlated with performance; the factor analysis has had to await the collection of more data. All other predictor-criteria relationships for subsequent years of the course will be examined in a similar way to that presented here, and additional statistical techniques will be employed. Factor analyses will be done of all predictors and criteria to improve degrees of freedom in multiple prediction, and canonical analysis, which to date has proved unilluminating, will be continued. The effect of correcting correlation coefficients for restriction of range will be examined. The effect of differential weighting of individual written examinations and studio work in the three years of the course will be explored.

DISCUSSION

In discussing the implications of the results of these naturalistic studies on selection procedures and academic performance of students at a specific university school of architecture, we will deal first with those relevant to higher education generally, and later with those particularly relevant to students of architecture, whether in university or in other schools. A word of caution is necessary here; the number of subjects involved is very small compared with those in more actuarial studies, such as those based on a whole university, or on a population examined by a G. C. E. Board in any one year. As cannot be too often stressed, local or temporal variations in the catchment population, in the selectors, and perhaps above all in the nature of the learning environment which together they help to engender, will affect the outcome of any selection procedure. So the extent to which this work can be made good use of by others, depends on the extent to which it is possible to recognise which of the factors that seem most significant in our situation are common to others. It is for this reason that we have made what otherwise may seem a tediously detailed report of our set-up as we see it. We shall not attempt to survey the literature on university selection as several excellent reviews of work in British conditions have been made (see e.g. Dale 1954, Furneaux 1961, Drever 1963, Kelsall 1963, Miller in press), some of which incorporate relevant findings from the very different conditions of America and Australia.

A brief comparison between architecture and other subjects is relevant. Performance in the Bachelors Degree course at the Bartlett (as at other schools of architecture) is assessed on written examinations and studio work. The situation is superficially comparable with that in science courses, which are examined by written examinations and laboratory work, but the relationship of the two aspects of work is different. It is probably true to say that the main intention of laboratory work in the undergraduate curriculum of the physical and biological sciences is to support the lecture courses, serving to exemplify the generalisations made there, and to demonstrate by specific examples the kind of concrete evidence on which they are based. Only secondarily, or incidentally, is their intention to train the student in the very various skills he will require for the application of his knowledge in professional work. In assessment for the Bachelors Degree, therefore, practical work usually plays a smaller part than theoretical work. In architectural education by contrast, studio work is traditionally the core of the curriculum, and theoretical studies its servant. Studio work developed out of the apprenticeship system, but in the form appropriate to full time education, as in university schools, it is generally not based on real-life projects, but sets the student a series of design problems of increasing complexity, which are supposed to simulate those he will meet professionally, either in part or in miniature. It confronts the student with the need to apply his theoretical knowledge; to take account of a large number of variables, to

evaluate conflicting demands, to consider several alternative solutions, in short, to plan or design, as he will need to do in his profession. There are closer resemblances between the structure of the training of architects and of doctors, both being profession-oriented university disciplines, but again the resemblances are only partial. In medicine traditionally the pre-medical and pre-clinical studies follow the pattern of the other sciences; though the selection of material may be profession-oriented, the methods of teaching it tend to be those of the pure sciences. The clinical courses, concerned more directly with preparation for the practice of medicine, are not contemporaneous with, but follow the basic science courses, and are based on apprenticeship, not on simulation. It is interesting to note a current tendency towards the introduction of "applied" work much earlier in the medical curriculum; in the extreme case, the student is already concerned with patients at the same time as he is learning the basic sciences. In this respect there are common trends in some schools of medicine and some schools of architecture.

The belief is fairly common among architects that professional design skill is not closely related to scholastic ability, (more generally that "creative" people are not necessarily "intellectual"). If this were so, our studies on selection would have little implication for other university disciplines, but we find a significant relationship between performance in written examinations and performance in studio work, which encourages us to present our other findings as of general interest.

The selection procedures we used were of a conventional kind. The offer of a place was made after interviewing two or three times as many candidates as we had places to offer, and the interviewees were chosen from a total of three to seven times as many candidates on the basis of information supplied in their application. Two aspects of our findings which are of general interest concern the predictive value of the criteria we used in selection for academic performance at university, that is, how valid these conventional criteria were, and the differences on psychological tests between the candidates we accepted and those we rejected, that is, what our conventional procedure was doing implicitly in regard to these variables.

Predictive value of selection criteria

We will examine first the efficiency of the first stage of our selection procedure, screening for interview, using data obtained from following up our 1963 applicants. They represented 44 per cent of all applicants to university schools of architecture through UCCA in 1963. The first stage of our procedure was efficient in the sense that our interviewees tended to do better in A-levels. We had rejected before interview a large proportion of those candidates who, according to their own replies to our questionnaire, were continuing to apply to a school of architecture, or had entered another career. The majority of these had not qualified for admission to a school of architecture, having failed to get 2 A-level passes. The argument in favour of selecting after A-level results are known is obvious. About a quarter of our 1963 applicants (some 300 resident in Great Britain) whose application forms we laboriously screened, failed to qualify for admission to any architectural school in that year. Even after screening for interview, in 1963 and 1964, 14 per cent of the 148 men we interviewed failed to gain passes in 2 A-levels.

A second point of general interest is that there was a relationship between our preference for candidates and the likelihood of their entering another school. The candidates we graded high on Academic Record and Referee's Report were more likely to be admitted to a university school than those we graded low. This might be used as an argument in favour of a centralised system of grading of applications to reduce the amount of labour wasted by duplication. An interesting point is that there is a relationship (though not statistically significant) between our grading of Candidate's Statement and acceptance by other schools, although they did not have the Candidate's Statement with which we supplemented the information given on the UCCA form about the applicant's activities and interests. There was no positive relationship between our grading of paper qualifications and acceptance by non-university schools, but it is to be noted that not all of the candidates would apply to non-university schools, and also that the non-university schools would not necessarily have the same information as that provided by the UCCA form.

Relevant to the wisdom of our policy of not admitting candidates who were not taking A-level mathematics is our finding that they were not lost to architecture, for they were not at a serious disadvantage in getting into other architectural schools. It also appears that they are as a group not academically superior to those taking A-level mathematics, either according to their performance in A-level examinations or to their performance at architecture school.

As to the relation of our selection criteria to performance at the Bartlett, we find that performance in the Bachelor's Degree Course is significantly related to previous Academic Record, i.e. in the great majority of cases, to performance in G.C.E. examinations (p. 67 ff). This is consistent with the results of many other studies which show a positive, if limited, relationship between school and university performance; Drever (1963) thinks that though there are wide variations, an overall correlation of between .3 and .4 seems a fair estimate. Dale (1954) and Furneaux (1961) have also reviewed this subject, and particularly relevant to our studies is that of Petch (1963) which included 27 architecture students; their academic achievement at university was in good agreement with their performance in A-levels in 1956.

Some interesting points arise out of comparing the different indices of academic performance. The grading of Academic Record made from the candidate's application form and based mostly on G.C.E. O-levels, is only marginally inferior as a predictor of performance in the degree course to that made after entrance, when A-levels have been taken (Table 28a and 28b). The difference between the two criteria for prediction of first year work, however, is more marked, particularly in the written examinations (Table 46). Although the difference is marginal in the candidates who entered the school, it supports, (as does our study of all applicants in 1963, cited above) the often made argument for reorganising the national arrangements for taking examinations, so that A-level results are available at selection, (see Albrow 1967, taking the extreme view that students should be selected on A-levels alone). It is interesting also to note that the index of Academic Record we have used, which is based on both O-levels and A-levels, and takes into account age, timing of examinations, range of subjects and family and school background, has better predictive value than

the "arithmetical" indices based on number of subjects passed and grades obtained at A-level, such as the Petch (1961) and UCCA (1965) grades (Tables 29a, b, 46). This also is in line with other findings. Drever (1963) says that if a correction is made for age at taking A-level, and if first sitting results only are used, the correlations with university performance are improved. Barnett and Lewis (1963) found that prediction is improved if age is taken into account, and S-levels or O-levels as well as A-levels.

Grading on Referee's Report was also positively related to performance at the Bartlett, though the relationship is not statistically significant (p. 80, Table 32). This is in line with some other findings. Johnson (1959) has asked referees to grade candidates for admission to medicine for "potentiality as a general practitioner" and for "potentiality as a research worker" and found a slight but non-significant relationship between these and performance in the 3rd M. B. examinations. Nisbet and Welsh (1966) also found the Headmasters' estimates of some predictive value for achievement in degree courses at Aberdeen. Drever (1963) comments that though teachers' reports are usually made in a way which makes statistical follow up difficult, there are hints at the statistical level that good evidence might be obtained from them. Furneaux (1961) makes the same point. This supports the argument for closer collaboration between schools and universities over selection of students, as over many other matters concerning educational welfare.

The third "paper qualification", the Candidate's Statement, correlated significantly with performance at the Bartlett (p. 80, Table 33). That the Candidate's Statement and Referee's Report should have any predictive value at all is surprising in view of the hazards of assessing a candidate's scholastic potential on the basis of what he and his referee say about him. On the face of it, the reliability of our gradings of these statements would not be promising (Petch (1964) found that schools tended to over-estimate their pupils' potentialities for passing A-levels). The grade given to the Referee's Report was a subjective assessment of a subjective assessment. It represents our guess at the candidate's likelihood of doing well at our school, and the evidence on which the guess was made consisted of statements about his past behaviour in a different situation, and predictions about his future behaviour in a situation substantially unfamiliar to the testifier. The Candidate's Statement is an essay of up to about 500 words describing his general interests and activities and more specifically those concerned with his choice of career. As with the Referee's Report, our grading of this represents a subjective assessment of a subjective statement. Both pieces of evidence are presented by people whose reliability and validity of judgment (these terms are used in the technical sense) have to be assessed. Not only ignorance of what is required of architectural students, but also personal interest in the outcome of the selection procedure, might be expected to cloud their judgment. That there should nevertheless be a correlation between these assessments and the assessments of performance at university three or more years later, made by quite different people, is encouraging for those interested in the processes of human judgment. A previous study using similar assessments of paper qualifications, showed significant relationship of performance in medical examinations with "general record" which was equivalent to our Candidate's

Statement, and positive but slight relationship with Referee's Report (Johnson 1959). Of the criteria available at selection for the 1960-64 cohorts, the combination of Academic Record with Candidate's Statement gave the best prediction of performance, and the addition of Referee's Report and Interview did not improve it.

The follow up studies we have been able to make, with the cooperation of the staffs of other schools of architecture, of candidates who did not enter the Bartlett, shows that performance at other architecture schools tended to show similar positive relationships with A-level performance and Referee's Report, and in university schools with our grading of Academic Record on application also, as was the case with the Bartlett students. Considering the small numbers of students concerned, distributed among 26 schools with a wide range of curricula and teaching methods, it is gratifying to find any consistency of relationship between these variables. However, we rejected 13 candidates who were placed in the top quartile of their class, and 5 of these were considered excellent students by their teachers. At the same time we admitted to the School 12 students who by our own standards were unsatisfactory; (1 withdrew to take up another course, 4 left after failing examinations, and 7 took longer than the minimum time to complete their degree.) More detailed studies of very successful students, and of causes of failure, would be useful. In the opinion of the tutor to undergraduate students at the Bartlett, about half of the 1960-1964 entrants who failed to complete the degree in minimum time did so because of "personal" difficulties, including problems of adjustment to university life in general, and to architectural work in particular. It is unlikely that such difficulties could be detected at selection; the problem is rather one of the management of the teaching-learning situation. It underlines the need for more facilities for counselling students to help them to sort out problems of identification and motivation. This area lies between teaching and therapy, and analysis of the problems in it would be helpful not only to those whose academic work suffers so badly that their examination performance is unsatisfactory, but also to those who succeed, but not as well, or as happily, as they might.

There is little sign that the judgments made at interview improve the predictive value of paper qualifications (though we need to examine further some indications that those made at a series of interviews with very specific aims may be helpful). This is consistent with the majority of findings on the validity of the selection interview (see e.g. Dale 1954, Furneaux 1961). If improvement of overall academic performance at university is the major aim, with reduction of the proportion of students who fail or take more than the minimum time to complete the degree, and if adequate information is available from the application form, then the interview is largely redundant. But as we discuss below, there are two other possible functions of the interview, in assessing personality, as distinct from ability to pass examinations, and in helping to introduce the future student to the school.

Of two psychological tests, AH5 and DPI, administered at selection but not used to influence it, AH5 did not show marked and consistent relationships with performance in the first year. Other studies report varying relationships between AH5 and university performance. Heim and Watts (1960) reported a

sizeable and significant correlation with performance in Cambridge degrees and Kelvin, Lucas and Ojha (1965) with University College London degrees, but Pilkington and Harrison (1968) found only low correlation with first year examination in psychology at Sheffield, while both A-levels and another intelligence test gave higher ones. The relationships of performance at the Bartlett with DPI are discussed on p.132.

Differences between accepted and rejected candidates

Most research on selection criteria is concerned with follow up studies, i.e. with establishing to what extent they are valid predictors of the kind of performance the subjects are being selected for. We have been able to follow another line of enquiry into the nature of selector's judgment, by studying the differences between the group of candidates regarded as acceptable and the group rejected, as far as they can be detected on performance on two psychological tests. These were a test of high grade intelligence, AH5, and the Dynamic Personality Inventory, and they were taken at the same time as the interview, but not used by the selectors. The subjects of this study were 260 men, belonging to three successive cohorts 1964-66; they were chosen for interview from 1,058 men educated in Great Britain.

The candidates we interviewed differed from those we rejected without interview, in having, as we judged, better academic potential and more favourable referee's reports. As to how they differed on the psychological tests from those not interviewed and not tested, an attempt to answer this question can be made by comparing the mean scores of those interviewees who had been given high grades with those given lower grades on Academic Record and Referee's Report, the two criteria which had been used to select for interview. It can be inferred that the candidates who were rejected before interview would be more like those who were low on the two criteria than those who were high on them.

Those graded high on academic record had higher (though not significantly so), mean scores on AH5 than those graded lower (Table 19), and though, as we discuss further below, there were some differences in the DPI profiles, these did not reach statistical significance. Those high on Referee's Report differed from those low on it in having a significantly higher mean score on AH5 II (diagrammatic items, Table 19) and on the DPI were significantly less 'emotionally dependent' (Od-) and had more interest in 'exploration and adventure' (Pi+) and greater 'creative interests' (CI+) (Fig. 36).

The correlation between grades on Academic Record and Referee's Report was quite strong (Table 13). As far as differentiating on the two psychological tests is concerned, it would seem that Academic Record and Referee's Report are additive in their effects. The mean scores on AH5 of the group high on both criteria was higher than the group low on both (p.45), and the differences between high and low groups on the DPI were in the same direction in 17 of the 33 scales, and on only 8 of them was the disparity between the two criteria at all marked (Fig. 4, p.54). We can infer that the candidates rejected without interview would differ from those interviewed in scoring lower on AH 5 and having a different profile on the DPI.

Grading on the Candidate's Statement showed no significant correlation with Academic Record, Referee's Report or AH5. On the DPI however the profiles of those high on Candidate's Statement were more sharply separated from those low on it than was the case with Academic Record and Referee's Report (Fig. 3c, p. 52). On five scales the differences between the means of the two groups were significant. The group high on Candidate's Statement had greater 'need for movement' (Om+) than the low group, was more 'unconventional' (Ou+), less 'authoritarian' (As-), more 'exhibitionistic' (Pe+) and had greater 'creative interests' (CI+).

The inclusion of grading on Candidate's Statement with Academic Record and Referee's Report as criteria for selection would have little if any effect on the distribution of AH5 between accepted and rejected candidates, but would increase the differences on DPI. On 17 of the 33 DPI scales the range of the three means of those high on Academic Record, Referee's Report or Candidate's Statement, did not overlap the range of those low on them, (Fig. 4) so the combination of the three criteria would intensify the differences between interviewed and rejected groups.

The offer of a place at the School was made after the candidate had been interviewed; in the case of the three cohorts reported here, three interviews were given, each by a teacher assessing different aspects of the candidate. The interviewer's judgments were influenced to varying extents by knowledge of the 'paper qualifications'. The gradings of the three 'paper qualifications' and the relevant documents were available to the interviewers, but the amount of attention which each paid to them, and the extent to which he was influenced by them, consciously or subconsciously, in making his own assessment of the candidate varied among the interviewers, and in the same interviewer in different years. Moreover in the discussions between the three interviewers about the final results, the paper qualifications might be taken into account to variable extents. The influence of the paper qualifications on the final decision was intentionally increased over the three years, as we got evidence of their predictive value for success in academic work at the school; (this variation, tiresome for statistical purposes, is an example of the unavoidable effects of the 'naturalistic' approach adopted in this work). Whereas in 1964 there was no correlation between the offer of a place and high grades on paper qualifications, in 1966 the relationships were fairly strong, and in the case of Academic Record and Referee's Report reached significance (Table 13).

The relation of individual interviewers' decisions to the candidates' performance on the psychological tests was also very variable, but the total effect of the selection procedure was to offer places to a group of candidates who clearly differed on the tests from those rejected. The accepted candidates had significantly higher mean scores than the rejected candidates on AH5 total and also on AH5 I (p. 45), and on the DPI differed significantly on six personality measures (p. 56). The profiles were strikingly separated over the whole "anal" group of scales, the accepted candidates being significantly lower than the rejected ones on three of the scales, "attention to details", "conservatism" and "authoritarianism". They also had high scores for "creative interests" and "femininity" and lower scores for "ego-defensive persistence".

The interactions of the predictors must be very complex. It is surprising that Academic Record less strongly distinguished candidates on the test of intelligence than did the Referee's Report or the final decision, and that the Candidates' Statement did not do so at all (Table 19). The Referee's Report was most effective in picking out the candidates high on the AH5 II, the diagrammatic part of the intelligence test, whereas the interviewers tended to pick out those high on AH5 I, reflecting perhaps that in an interview verbal proficiency counts. Sensitivity to the variables measured by DPI is very slight in Academic Record, (also in AH5), stronger in Referee's Report, still stronger in Candidate's Statement, and strongest in the final decision made after interview (Fig. 3).

We intend to pursue this study of the judgments made at selection and their relation to DPI profiles. The three cohorts which succeeded the three reported here will double the population whose DPI scores are available, and interpretation of the results will be facilitated by factor analytic studies of the test. The later cohorts will also provide interesting comparative material for further study of the interview, because they were selected for interview in a similar way to their predecessors, but were given one interview instead of three, and the final decision was made on the basis of equal weighting of ratings on all three paper qualifications and interview. We also plan to analyse in terms of the DPI, the gradings made of the Referee's Report and Candidate's Statement, by relating the specific kinds of statement rated high or low by the assessors to items of the DPI scales. In this way we hope to discover what clues are being picked up by selectors from the written statements that might explain their relationships with the personality test.

The functions of the interview

It is widely recognised that success in examinations is not always a guarantee of success in professional work. Some of the personality variables which contribute to effective behaviour in later life, in other places and in different circumstances, are not necessarily measured by the ability to work for examinations and pass them. Defenders of selection by interview believe that they can assess such virtues by personal confrontation. To determine whether they can indeed do so requires the follow up of selectees and rejectees beyond examinations, into performance in practice, a procedure filled with technical difficulties, and requiring at minimum a lapse of several years. In the meantime, it is of interest to know whether there are consistent measurable differences in personality between those candidates who were offered a place and those rejected, whether or not any such personality differences have as yet been found to be of predictive significance. Our work with the DPI scores of interviewed candidates is relevant here. If our candidates were selected on previous academic performance alone, it would seem that those offered places would, on the average, not differ markedly from those rejected, as far as their personalities as assessed by this test are concerned. But if selection were made according to our ratings on either the Referee's Report, or the Candidate's Statement, or on a combination of these, then there would be significant differences on various personality scales. As we have seen the most marked differences are obtained with three interviewers, who were taking the paper qualifications into account to various and unknown extents.

(Fig. 3d). The variation between individual interviewers, and in the same interviewer from year to year, is such that a single interview, with several interviewers sharing the work, is not likely to separate groups which on average differ markedly and consistently on the personality scales.

Granted that our total selection procedure does differentiate candidates according to personality, we do not yet know whether the differences are advantageous. The relationship between personality and performance in the first year of the course is by no means the most important test of whether the differences are advantageous. But it does seem that several characteristics—'initiative', 'emotional independence', and lack of 'passivity'—to which the interviewers responded favourably, tend to be associated with good performance at this point (Table 48). These results are particularly encouraging, because if the DPI scales are valid in our context, these characteristics are certainly among those which the Bartlett would wish to see associated with success in examinations and studio work.

We hope the extended studies of the following three years will provide better guides to action. At present it looks as though the great expense of interviewing, at least of triple interviewing, is not justified. With a minimum of 20 minutes per candidate, and discussion of the final grading, roughly the equivalent of three weeks of a teacher's time is consumed, which might be better spent teaching. The financial cost of our 3-interview system for 90 candidates was estimated to be roughly equal to the cost of the whole of the rest of the selection procedure, (screening of all 700 or so applications, shortlisting, etc.). A good deal of the latter, though extremely time consuming, was done by administrative staff and did not encroach on teaching time.

While we think it likely that candidates can be selected quite effectively on the basis of paper qualifications, we do not recommend that they should be admitted to the School without previous personal contact with it. In ordinary circumstances the interview does at least give the candidate an opportunity to see the inside of the building in which he will spend three or more formative years, and to meet one or more representative members of the institution (whether or not he ever sees them again). Candidates should be able to spend several hours in the School seeing its work and being entertained by students. They should see some of the staff also, but the main function of the meeting should be to acquaint the candidate with his future teachers, rather than for them to assess him. It may be that what this encounter communicates to the candidate of the ethos of the institution is more reliable than the information an interviewer gets from him about his suitability, and of greater beneficial consequence, in the long run, to the products of the School.

The nature of architectural students

In this passage we bring together points of interest relevant to architectural education more specifically. In considering how our students compared with other university students, we note that a greater proportion of them come from the upper three of the Registrar General's five social classes, and more come from technical schools (p.10 ff). The former is doubtless connected with the long and

expensive training necessary for the profession, and the latter with its practical bias. Academically, as measured by performance in A-level examinations, our students rate higher than the body of architectural students on average in universities, which is low compared with the national mean for all students; this reflects the emphasis we place on previous Academic Record in selection.

The differences between our interviewees and the university student norms in scores on two psychological tests are interesting in connection with occupational choice. Our interviewees do less well than average on the verbal and arithmetical part of an intelligence test, AH5, and better on the diagrammatic part. In this respect they are more like the high-grade engineering apprentice applicants, for whom Heim (undated) quotes norms, than her sample of university students. The interview procedure however, favours those high on the first part, so the body of students admitted to the School are average on Part I and above average on Part II (p. 45). The differences between our interviewees and the student norms on the Dynamic Personality Inventory are quite marked (Stringer and Tyson, 1968). Apart from the interviewees' pronounced 'creative' and 'tactile and handicraft interests' there are three other principal areas in which they differ in self-image. They are more 'emotionally independent' and 'unconventional', and have a greater 'need for movement'. They are less 'authoritarian', less 'submissive to authority', and less 'conservative'. And they have a higher 'drive for achievement' and are more typically 'masculine' in the pattern of their interests and activities. It may be that some of these differences are connected with widespread differences in attitudes accompanying social change since the norms were established in 1954, but it is unlikely that this explains all the differences. In contemporaneous studies, differences between architectural students and art students (Stringer 1967) and engineering students (Stringer in progress) are being found. On face value, some of these tie up with occupational choice. There is, for example, a considerable fit between the self-images of architectural and art students, and similarities are more noticeable than differences. But although the architectural students share many of the liberal and unconventional attitudes observed in the art students, they lack their marked emotional reactivity and their withdrawal from social behaviour.

There is clearly a rich field here for research on the relation between personality and occupational choice, and for deepening our understanding of the possible interrelations of different kinds of education and personalities. If we can extrapolate from the results of our selection procedure, it would seem that the body of applicants for architecture differs on average from the general body of university applicants in certain ways, and that our particular selection process results in our students being still more different from the general body of students.

As to the relation between subsequent performance in architectural studies, and what is looked for in applicants, our most significant finding is of the great importance of previous examination record for predicting success in studio work as well as in written examinations. The Candidate's Statement is also useful in predicting aptitude for studio work in the first year, but the interview not at all, even one based on the candidate's portfolio and especially intended to assess his potentiality for design.

Architectural schools are concerned about what A-level subjects should be required of candidates. The Bartlett School, among others, requires a pass in A-level Maths, (or the equivalent), and since all of our entrants have this we have no evidence on the relationship of it to performance in the School. We do find, however, that for good or ill, this requirement restricts us to a population of students who have a preponderantly scientific bias; our applicants who are taking A-level Maths more often take Physics or Chemistry than History or Geography, and the reverse is true of those who do not take A-level Maths (p. 14). Physics seems to be a slight help in the Structures and Scientific Principles of Building courses, which is not surprising, and students who have taken Art at A-level have a slight tendency to do better in studio work than those without it (p. 77). It is not clear, of course, whether these relationships are connected with motivational choice, that people who are interested in structure are interested in Physics, and those interested in designing, interested in art, or whether they indicate that the contents of the A-level courses are helpful in themselves. In any case the relationships are not sufficiently strong to give good guidance to selection. It would seem wiser to encourage budding architects to get a sound general education at school, as well as at university which is what a recent report (McCarthy 1968) advocates for the training of scientists and technologists.

SUMMARY

Selection

An account is given of procedures used for the selection of students at a university school of architecture over the period 1960-68.

The number of candidates rose from 120 in 1960 to 700 in 1967, dropping slightly to 650 in 1968; the number of women has remained fairly constant since 1963 at about 50 a year, and that of overseas applicants rose from 60 to 120, again with a slight drop in 1968 (Table 1, p. 8). On the basis of a grading of their previous Academic Record and their Referee's Report, about 90 each year are now invited to attend an interview. The number of places available rose from thirteen in 1960 to forty-five in 1968.

Over half the applicants would have been eighteen years old when they entered the School, a quarter nineteen, and a seventh between twenty and thirty.

Of 1,002 men educated in Great Britain who applied in 1964/65/66, 36 per cent were from the Registrar General's social class II, 26 per cent from each of classes I and III, 3 per cent from IV and none from class V (8 per cent were unclassified) (Table 2, p. 10). The majority (60 per cent) came from direct grant and grammar schools, 23 per cent from independent schools and around 5 per cent from each of comprehensive/bilateral, technical, and secondary modern schools (Table 3, p. 11).

About 15 per cent of the candidates were already qualified for admission, and another 20 per cent had taken some A-levels. Over half had six, seven or eight O-level passes, and a third nine or more (Table 4a, p. 12).

The likelihood of failing to qualify for admission after being offered a place was greater in candidates with poor Academic Record, and the likelihood of withdrawing was greater among those candidates who did not give University College as their first preference (Table 7, p. 29).

The proportion of students entering the school with the minimum requirement of two A-levels was 15 per cent, (similar to the national average of all university students in 1965), but has since dropped to half (Table 10b, p. 34).

Interviewees 1964-66

An intensive study was made of certain characteristics of applicants interviewed in the three years 1964-66. The interrelationships of the following variables are reported: Academic Record on Application (AR App.), Referee's Report (RR), Candidate's Statement (CS), interviewer's decisions (three teachers separately interviewed each candidate), and performance on two psychological tests (which were not used at selection), AH5, a test of high grade intelligence, and DPI, the Dynamic Personality Inventory.

Candidates offered a place after interview did not differ significantly from those rejected on their grades on AR App., but they did on RR, CS, and on parts of AH5 and DPI (pp. 38, 47, 56).

On AH5 (Total) the mean score of the 260 interviewees was significantly higher than the student norm, the difference being due to superiority on Part II (non-verbal); their mean score on Part I (verbal and numerical) was significantly lower than the norm (p. 45). Candidates with high AR App., or RR grades had higher (but except in the case of Part II and RR, not significantly so) mean scores than those with low; there was no difference in the case of CS (p. 45). Accepted interviewees had higher mean scores, especially on Part I (verbal and numerical) than those rejected; their mean total score and Part II score were significantly higher than the student norms; their Part I score slightly lower but not significantly so (p. 47).

On DPI the interviewees were significantly different from student norms on eighteen of the thirty-three scales, of which higher "tactile and handicraft interests" and lower "authoritarianism" were the most outstanding. DPI scores show no significant relationships with AR App. but a number with RR and CS. Candidates with high grades on RR differed significantly from those with low grades in being less "emotionally dependent" having greater "interest in exploration and adventure" and more "creative interests" (Fig. 3b). Candidates with high scores on CS differed significantly from those with low in having greater "need for movement", in being less "authoritarian", more "unconventional" and "exhibitionistic" and having more "creative interests" (Fig. 3c).

Candidates high on AH5 differed significantly from those low on it in being more "impulsive", and in having less "liking for seclusion" and "interest in children". Interviewees offered a place differed from those rejected in having significantly higher scores for "creative interests" and "femininity", and lower scores for "conservatism", "authoritarianism", "attention to details" and "ego-defensive persistence" (p. 56).

Seven interviewers differed from adult norms on the DPI in roughly the same ways as the candidates differed from the student norms, but it seems they were choosing candidates who deviated most from student norms, rather than those most like themselves (p. 57).

Performance in Bachelor's Degree Course, Cohorts 1960-64

Of the 112 students admitted to the Bartlett 1960-64, 79 have passed the Bachelor's Degree, 8 are still studying for it, having had to repeat a year, and 25 have left without a degree.

The present success rate is 71 per cent of entrants (60 per cent in minimum time), and the loss 22 per cent. The "lost" students (excluding four who withdrew early in the first term) occupied a total of 34 student year places (Table 26). The 12 "limpers", who have so far completed the degree, occupied 43 student year places instead of the minimum 36. 67 entrants completed the degree in the minimum time; those who took longer had relatively poor final results. Of the 45 students who failed to complete the degree in the minimum time, about half are known to have been affected by personal problems (p. 66).

There was a significant relationship between performance in written examinations and in studio work (p. 66).

Of the criteria used for selection, Academic Record at application (AR App), Candidate's Statement (CS) and interview were significantly related, and Referee's Report positively, but not significantly, related to performance at the Bartlett. There was no consistent relationship between statements made at a board interview about specific characteristics of candidates and the opinions of teachers who became familiar with their work as students. The best combination of criteria was Academic Record (App) with Candidate's Statement, and it is not improved by the addition of Referee's Report and interview.

A global assessment of Academic Record at entry (AR Ent) and measures of A-level performance, (UCCA and Petch) were also significantly related to performance at the Bartlett, and students with more than two A-level passes did better than those with two only.

Students with A-level pass in Physics did slightly better in examinations in Structures and in Scientific Principles of Building than those without it, but they also had slightly better Academic Records. Students with A-level Art did slightly better in studio work than those without it; there was no difference in overall performance.

Candidates who did not enter the Bartlett, 1963, 1964

Of the 272 applicants to the Bartlett in 1963 who were followed up, 62 per cent had been admitted to an architecture school (35 per cent to university and 27 per cent to non-university schools), 23 per cent were continuing to apply and 15 per cent had taken up another career. About a quarter of the applicants had failed to qualify for admission to architecture schools. (Table 36a, p. 88). The sample was 44 per cent of those applying to university schools of architecture through UCCA in 1963.

45 per cent of our candidates who entered university school had a 'good' performance at A-level as defined by UCCA (UCCA 1965) compared with 14 per cent of those entering non-university schools. Those continuing to apply or taking up another career were academically weaker.

Among candidates taking A-level maths, a significantly ($p < .05$) greater proportion (70 per cent) of those who were invited to interview at the Bartlett than of those not interviewed (47 per cent), succeeded in entering other schools of architecture. Those not taking A-level mathematics were not at a serious disadvantage compared with those taking A-level mathematics (Table 37, p. 91).

There was a tendency for other university schools to give places to candidates who scored high on our grading of Academic Record, Referee's Report and Candidate's Statement. The relationship was significant for Academic Record and Referee's Report at $p < .01$ and $p < .001$ respectively (Table 38, p. 92); it was not significant for Candidate's Statement. No such relationship was apparent in the non-university schools, but not all the candidates for university schools necessarily applied to non-university schools.

Candidates invited to interview by the Bartlett tended to be more successful than those not invited, in subsequent A-level examinations, as indicated by UCCA and Petch grades, and performance in Mathematics and Physics separately; they had about the same grades in Art. The relationship is significant for UCCA $p < .001$, Petch $p < .01$, Mathematics $p < .01$ and Physics $p < .01$ (Table 39, p. 96).

The performance at other schools of architecture of 67 of our 1963 candidates, and of 29 of our 1964 interviewees has been studied. Of the 1963 candidates a larger proportion of those with A-level Mathematics who were interviewed, than of those not interviewed, were placed by their tutors in the high performance group of their class, and there was a very slight tendency for those who took A-level Mathematics to do better than those who did not; the relationships were not significant by X^2 test (Table 40, p. 98).

In the 1963 candidates and 1964 interviewees, performance in university schools, but not in non-university schools, tended to be better in those students we had graded high on Academic Record on application. In both university and non-university schools (Table 41, p.100) performance tended to be better in those students we had graded high on Referee's Report; in those who did better in A-level examinations and, in the 1964 group, in those graded high in the interviews. The relationships are not significant except for that with Petch grade ($p < .05$) for university students, and that with UCCA score ($p < .05$) and Physics grade ($p < .02$) for all students (Table 42, p.104).

Obtaining exemption from the RIBA Intermediate Examinations in minimum time was used as another criterion of performance at architectural school. There was a positive, though not significant relationship of this criterion with our grading of students' Academic Record (App) in the case of university schools, but not in non-university schools. In both cases there was a positive though not significant relationship with Referee's Report.

In choosing our students for admission in 1963 and 1964, we rejected 13 of 21 who were placed in the top quartile of their classes in other schools of architecture; 5 of these were regarded as "excellent"; we had admitted 12 students who were unsatisfactory at the Bartlett.

Performance in First Year at the Bartlett, Cohorts 1964-66

A detailed study has been made of performance during the first year at the Bartlett, (in studio work and four written examinations) of seventy-eight male students of the 1964/5/6 cohorts, and its relation to information available before admission (Table 46, p.114). Information provided by the UCCA form, (Academic Record on application and Referee's Report) had little predictive value for first year work, though correlations of AR App. with studio mark and with overall performance came near to being significant. Academic Record on entrance (AR Ent), taking post-interview examinations into account, and Petch category based on A-levels only, gave better correlations than AR App., Petch especially with written examinations, AR Ent. with both written examinations and studio work (the UCCA grade was not so effective as a predictor). Candidate's Statement gave significant correlations both with studio work and examinations separately, and with overall performance. The best single predictor of overall performance was AR Ent., then CS, then Petch. Interview gradings were positively, but not significantly related to first year Bartlett performance.

AH5 gave variable correlations with it, and the DPI gave mainly rather inconclusive, and very few significant ones.

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